MINE AND RECLAMATION PLAN

FOR THE

MOUNTAIN PASS MINE

Submitted to:

COUNTY OF SAN BERNARDINO
Land Use Services Department
Planning Division
385 N. Arrowhead Avenue
San Bernardino, CA 92415

Prepared by:

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MOUNTAIN PASS MINE
MINE AND RECLAMATION PLAN SUMMARY

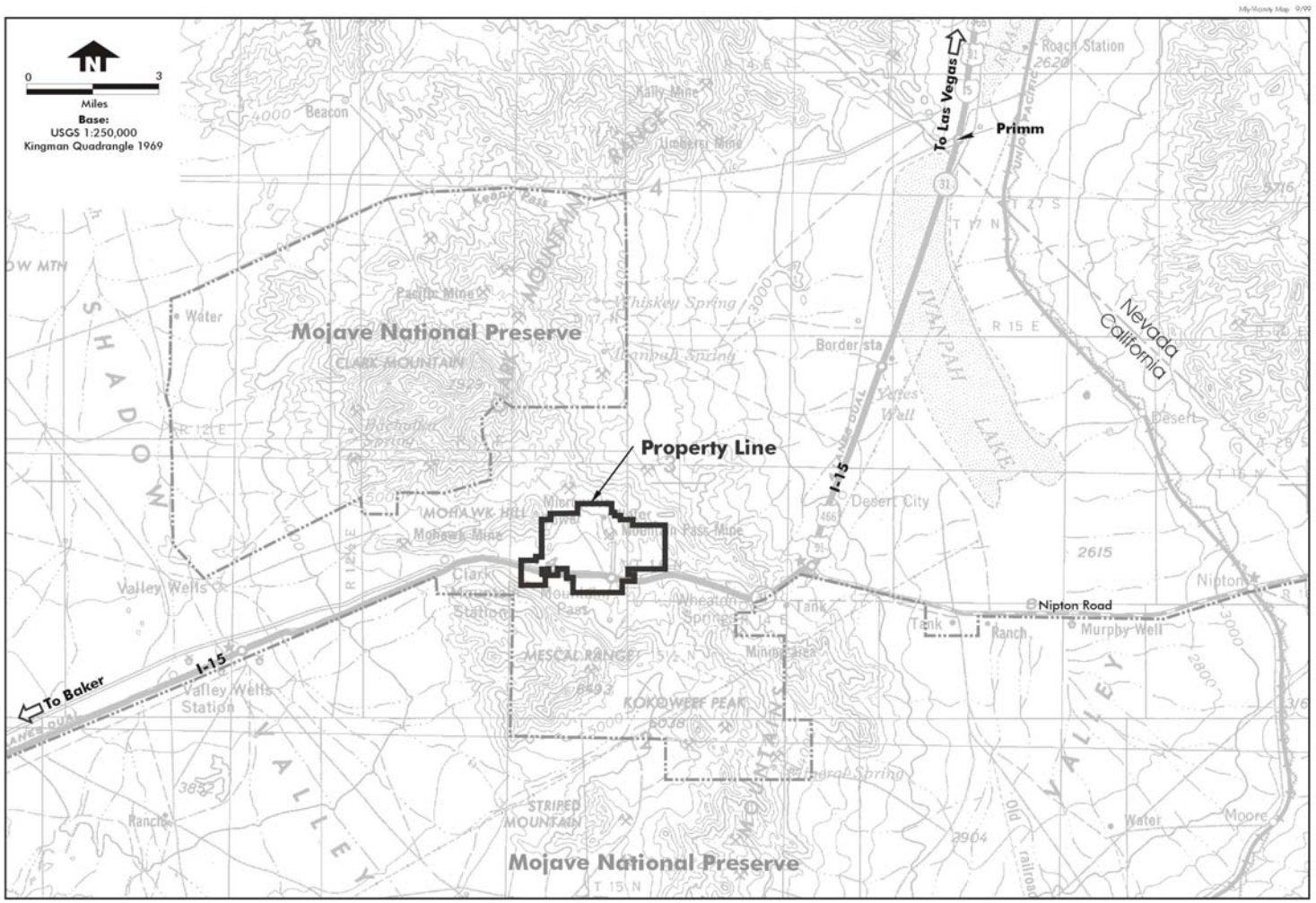
Molycorp Inc. operates a mining and mineral recovery facility, known as the Mountain Pass Mine, located in extreme northeastern San Bernardino County, California. The site is located 15 miles southwest of the California-Nevada stateline along Interstate 15 (I-15), in the Clark Mountain Range, at an elevation of approximately 4,800 feet above mean sea level (msl) (see Figure S1). The Mountain Pass Mine is privately held land. The Mine Reclamation Plan area is within the boundaries of the privately held site.

This Mine and Reclamation Plan (Plan) describes the ongoing and planned mining, stockpiling, and mineral recovery operations, and reclamation at the Mountain Pass Mine for the next 30-year operational period followed by a final reclamation period of 10 years. Molycorp is also planning the construction two facilities: (1) a new tailings storage area to replace the existing North Tailings Pond (P-16) and (2) onsite evaporation ponds to replace the existing inactive New Ivanpah Evaporation Ponds located 8 miles northeast of the mine and eliminate the associated off-site wastewater pipeline.

Molycorp has utilized technical and feasibility reports, environmental information, and current regulations of jurisdictional agencies to plan the economic development of its ore resources. The Plan incorporates these natural and reasonable expansions and provides a comprehensive document for environmental analyses. The ongoing and planned operations will retain virtually all elements of the existing operation and will consolidate all operations within the privately held project boundary. Future operations will not alter the mining and mineral recovery rates and hours of operation that occurred under historic operating conditions.

Molycorp has a vested right to conduct surface mining operations pursuant to the California Surface Mining and Reclamation Act, Public Resources Code Section 2776 ("SMARA") and the San Bernardino County Development Code Section 812.22020. Molycorp and its predecessors have mined the lanthanide ore body and recovered various lanthanide elements at Mountain Pass since about 1951, prior to the enactment of SMARA and the County's Development Code. The application submitted to the County of San Bernardino is for approval of a Conditional Use Permit (CUP) for the new tailings storage and onsite evaporation ponds and a revised Reclamation Plan for ongoing mining, stockpiling, and mineral recovery operations over the entire mine site including these two new facilities.

The Mountain Pass Mine is within the historic Clark Mining District established in 1865. Mining and the recovery of various minerals have been undertaken in this area since that time. For the past 50 years, Molycorp and its predecessors have mined the lanthanide ore body and recovered bastnasite, the mineral of interest, which contains 14 individual lanthanide elements. These lanthanide elements have a number of unique energy, environmental, and lighting applications which include among others: computer disk drives, chips, and color monitor screens, cellular phones, automobile emission control catalysts, petroleum cracking catalyst to save energy, batteries, lighting, solar and fuel cells, x-ray and Cat scan imaging, lasers for surgeries and guidance systems, special optical devices, fiber optics communications, magnets for a variety of



Site Location Map

Mountain Pass Mine
San Bernardino County, California

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Figure S1

S-2

common uses, and in glass and glass polish. Today, the Mountain Pass Mine is a major supplier of lanthanide products in the United States and the world.

ONGOING OPERATIONS

The mine site consists of approximately 2,222 acres of privately held land of which approximately 685 acres are currently disturbed. The mine site boundaries at Mountain Pass are delineated on Figure S2. Ongoing mining, stockpiling, and mineral recovery operations include the following major activities and facilities, which are detailed in Section 1:

- A single open pit mine for extraction of the lanthanide ore;
- West and North Overburden Stockpiles – overburden consists of non-ore bearing or waste rock extracted from the pit;
- North Tailings Storage Area (P-16) for storage of tailings produced from the mill/flotation plant;
- Crusher and mill/flotation plant;
- Mineral recovery plants;
- Offices, warehouses, and support buildings;
- Two of four approved onsite evaporation ponds constructed in the years 2000 - 2001;
- Product storage areas or ponds; and
- Stormwater ponds.

Fresh water supply systems associated with the Mountain Pass Operations are located off the mine site. The Ivanpah well field is located east of the mine on privately held land. The Shadow Valley wells are located to the west on both private and public lands. The pipeline systems cross public lands administered by the Bureau of Land Management (BLM) and the National Park Service (NPS). The pipeline facilities have previous approvals from the BLM and NPS and this Plan does not propose modifications to these approved facilities.

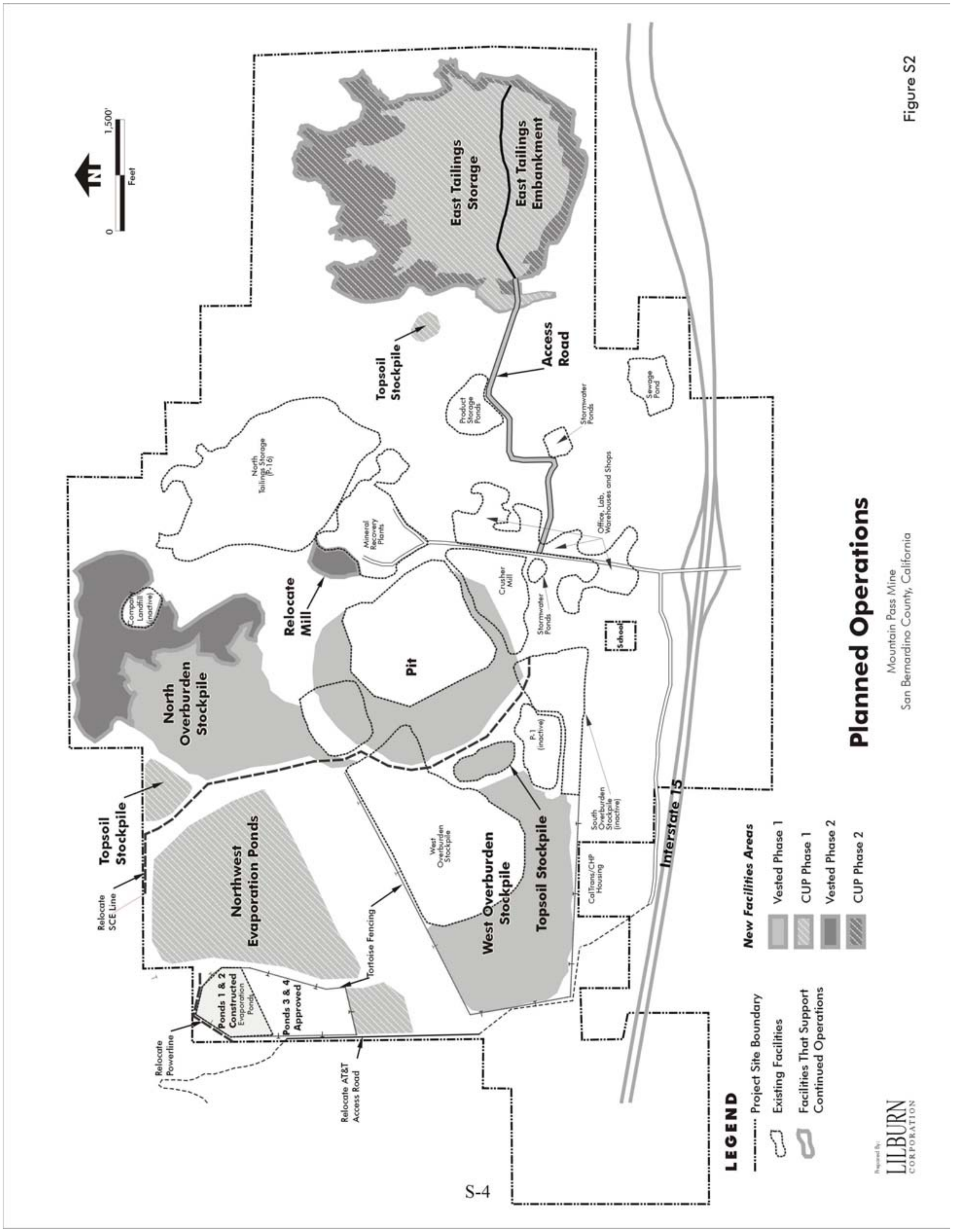
Monitoring and remediation activities are occurring onsite and on public lands administered by the BLM and NPS. These activities are part of the existing operating conditions and are required to maintain compliance with various environmental regulations. These activities are not part of the Planned Project. The following descriptions are provided for the information of the reader:

- Ongoing ground water monitoring and remediation at the Mine & Mill Site and Old and New Ivanpah Ponds under the Regional Water Quality Control Board (RWQCB) Order Nos. 6-91-836, 6-90-56, and 6-90-41, respectively.

- Implementation of a revised Ground Water Corrective Action Program for the Mine & Mill Site as specified in RWQCB Cleanup and Abatement Order No. 6-98-19 and Board Order No. 6-00-101.

- Closure of the two inactive onsite landfills with post-closure monitoring.

- Closure and reclamation of the existing inactive wastewater pipeline across BLM and NPS lands.


Planned Operations
Mountain Pass Mine
San Bernardino County, California
Figure S2
0
1,500'
Feet
N
East Tailings Storage
East Tailings Embankment
Access Road
Topsoil Stockpile
Product Storage Ponds
Stormwater Ponds
Sewage Pond
North Tailings Storage (P-16)
Mineral Recovery Plants
Office, Lab, Warehouses and Shops
Relocate Mill
Crusher Mill
Company Landfill (inactive)
North Overburden Stockpile
Pit
School
P-1 (inactive)
Topsoil Stockpile
South Overburden Stockpile (inactive)
West Overburden Stockpile
West Overburden Stockpile
Topsoil Stockpile
CalTrans/CHP Housing
Interstate 15
Relocate SCE Line
Topsoil Stockpile
Northwest Evaporation Ponds
Tortoise Fencing
Ponds 1 & 2 Constructed Evaporation Ponds
Ponds 3 & 4 Approved
Relocate Powerline
Relocate AT&T Access Road
LEGEND
Project Site Boundary
Existing Facilities
Facilities That Support Continued Operations
New Facilities Areas
Vested Phase 1
CUP Phase 1
Vested Phase 2
CUP Phase 2
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- Closure of the former tailings pond P-1 as approved by RWQCB (WDR 6-00-74)

- Investigation, closure, remediation (if necessary), and ground water monitoring of the New Ivanpah Evaporation Ponds under RWQCB Cleanup and Abatement Order No. 6-98-20;

- Investigation and ground water monitoring associated with the Old Ivanpah Evaporation Pond under RWQCB Cleanup and Abatement Order No. 6-98-21; and

- Closure, reclamation, and monitoring of various inactive ponds used in previous operations for mineral recovery, as described in RWQCB Cleanup and Abatement Order No. 6-98-19.

PROJECT DESCRIPTION

The Mine and Reclamation Plan envisions a mine-operating and reclamation period covering the next 30 years in two 15-year operational phases from the date of the final Plan approval from the County of San Bernardino. If operations do not continue at the end of the 30-year planning period, a 10-year period for final reclamation and revegetation will be initiated. Note that the California Code of Regulations (CCR) Title 27 requires post-closure maintenance and monitoring for 30 years for mine waste management units including the tailings storage areas and ponds. Future exploration and mining activities could provide information about additional ore resources, which could lead to the continued operational viability of the site past the discussed 30-year planning period. If operations are expected beyond the next 30-year period, then Molycorp will be required to amend and update its Reclamation Plan at that time.

The objectives of the 30-year operational plan including the development of the East Tailings Impoundment and the Northwest Evaporation Ponds, are as follows:

1. To continue mining, milling, and mineral recovery operations to recover lanthanide elements in accordance with vested operations maximizing use of onsite facilities, equipment, and personnel.

2. To continue vested milling and mineral recovery operations utilizing new tailings and wastewater facilities, which incorporate state of the art technology for groundwater and environmental protection.

3. To continue vested mineral recovery operations in an economic fashion to recover the only domestic source of lanthanide elements, which are used in various medical, automobile and space technology applications.

4. To continue vested mining, milling, and mineral recovery operations within the boundaries of Molycorp's private land at Mountain Pass and to eliminate use of public lands for the wastewater pipeline and evaporation ponds.

The 30-year planned activities are based upon an engineering assessment of ore reserves and resources including technical, economic, and environmental factors. For planning purposes, the development of the mine is engineered as a series of foreseeable stages that maximize mining and mineral recovery activities utilizing existing onsite facilities, equipment, and personnel and consolidates all operations onsite on privately held lands. In order to continue economically mining the ore resources at the site, the following mining and wastewater management facilities are planned (see Figure S2):

- Increase the existing open pit from 55 acres to 118 acres and deepen it from a depth of 350 feet to 770 feet for the continuing recovery of the ore body;

- Increase the existing West Overburden Stockpile from approximately 70 to 160 acres and from a crest height of 4,950 to 5,100 feet above mean sea level (msl);

- Increase the existing North Overburden Stockpile from approximately 18 acres to 145 acres and increase the crest height to 5,125 feet above msl;

- Provide tailings storage to replace the North Tailings Storage Area (P-16) through construction of a lined 174-acre tailings impoundment (East Tailings Storage Area) in the eastern portion of the site (part of CUP). The East Tailings Storage embankment would cover an additional 48 acres and have a final height of approximately 4,650 feet above msl or 240 feet above the existing ground elevation;

- Provide approximately 78 acres of onsite evaporative surface ponds on approximately 136 acres (part of CUP) for evaporating treated wastewater to replace the New Ivanpah Evaporation Pond. These ponds would be located in the northwest portion of the site on approximately 173 acres including berms, access, and the existing evaporation ponds. (Note that two ponds were constructed in 2000-01 on 37 total acres and are included within the 173 acres but are not part of the planned project);

- Relocate the existing mill/flotation plant and crusher to the north of the existing Separations Plant in order to facilitate the planned southward pit excavation in Phase 2; and

- Construct access/haul roads to the East Tailings Storage Area and other new facilities.

The additional area to be disturbed by the continuing vested operations would total approximately 268 acres. Areas disturbed under the CUP by the planned East Tailings Storage Area and the Northwest Evaporation Ponds would total approximately 374 acres. At the end of the 30-year planning period, the total area disturbed would consist of approximately 1,327 acres.

RECLAMATION AND CLOSURE

The Reclamation Plan includes plans for concurrent reclamation and closure of facilities no longer utilized, a phased reclamation of facilities that cease operations over the course of the 30-year plan, and reclamation of the remainder of the site following termination of mining in conformity with SMARA.

Inactive and Closed Facilities

As listed above, monitoring, remediation, and reclamation activities are occurring onsite as part of the existing operating conditions. A revised Ground Water Corrective Action Program for the Mine & Mill Site as specified in RWQCB Cleanup and Abatement Order No. 6-98-19 is being implemented. Wastewater ponds onsite have been closed under state regulatory guidelines and oversight by the RWQCB to minimize impacts to ground water. To remediate the existing ground water conditions, several ground water extraction systems are in place that recover impacted ground water by pumping extracted water into the onsite wastewater management systems. A sampling program is being conducted and an extensive ground water monitoring system is operational throughout the project site and downstream offsite to monitor existing constituent levels. The West Tailings Pond (P-1) is being closed as approved by the RWQCB under WDR 6-00-74.

Two small Class III landfills in the northern portions of the site were previously used for domestic and inert wastes. These landfills are now inactive and ground water and gas monitoring wells have been installed. Final closure plans are under review by the regulatory agencies.

Surface Reclamation Activities

Disturbed areas onsite that are no longer used for operations are being graded and revegetated by transplanting plants from areas to be cleared and by placement of removed surface material to act as a seed bank. These areas are located along the south side of the active operations (north of I-15), mainly around the entrance where the old mobile home park was located and along the face of the south overburden stockpile. An area with available water to the east of the entrance is also being used for plant storage.

Future Planned Reclamation

The objectives of this Reclamation Plan are to:

- Eliminate or reduce environmental impacts from mining and mineral recovery operations;
- Reclaim the site in a usable condition for post-mining end uses which may include:
  - Habitat for native desert wildlife and plants
  - Future mining of the unique mineral resource onsite
  - Recovery of lanthanides from tailings and low grade ore
  - Use of overburden for construction aggregate
  - Continued use as a transportation and utility corridor

- Geological research and field studies
- Rangeland for domestic livestock;

- Contour mining features and revegetate disturbed areas to minimize aesthetic and potential erosional impacts; and
- Reclaim and remediate the site as necessary to eliminate impacts to public health and safety and to ground water quality.

As operations progress and specific areas are phased out, disturbed areas will be scarified and contoured as necessary and revegetated. During the two operational phases, these areas will include the North Tailings Storage Area (P-16) and other ponds no longer in use, the North and West Overburden Stockpiles, and other disturbed areas mainly east of the plants and offices.

Following termination of mining and if no future mining and mineral recovery activities are planned or approved, the mill/flotation plant, mineral recovery plants and ancillary buildings, tanks, equipment, warehouses and offices deemed un-necessary will be removed. Infrastructure and foundations will be removed or buried in-place and disturbed areas will be graded as necessary and revegetated. A safety berm with warning signs will be constructed around the pit. The slopes of each stockpile lift will be contoured to an overall 2.3H:1V as the lift or bench immediately above it is completed, sculptured to conform to adjacent hills, covered with salvaged surface material, and revegetated. Roads deemed non-essential for access and maintenance of the site will be scarified and revegetated as required by the approved Reclamation Plan. The planned East Tailings Storage Area and the Northwest Evaporation Ponds (except for those ponds necessary to continue ground water remediation) will be closed, covered with cap material, and revegetated per California Code of Regulations Title 27 with approved closure and post-closure maintenance plans.

MOLYCORP, INC.
MOUNTAIN PASS MINE

MINE AND RECLAMATION PLAN

1.0 CONTINUING OPERATIONS

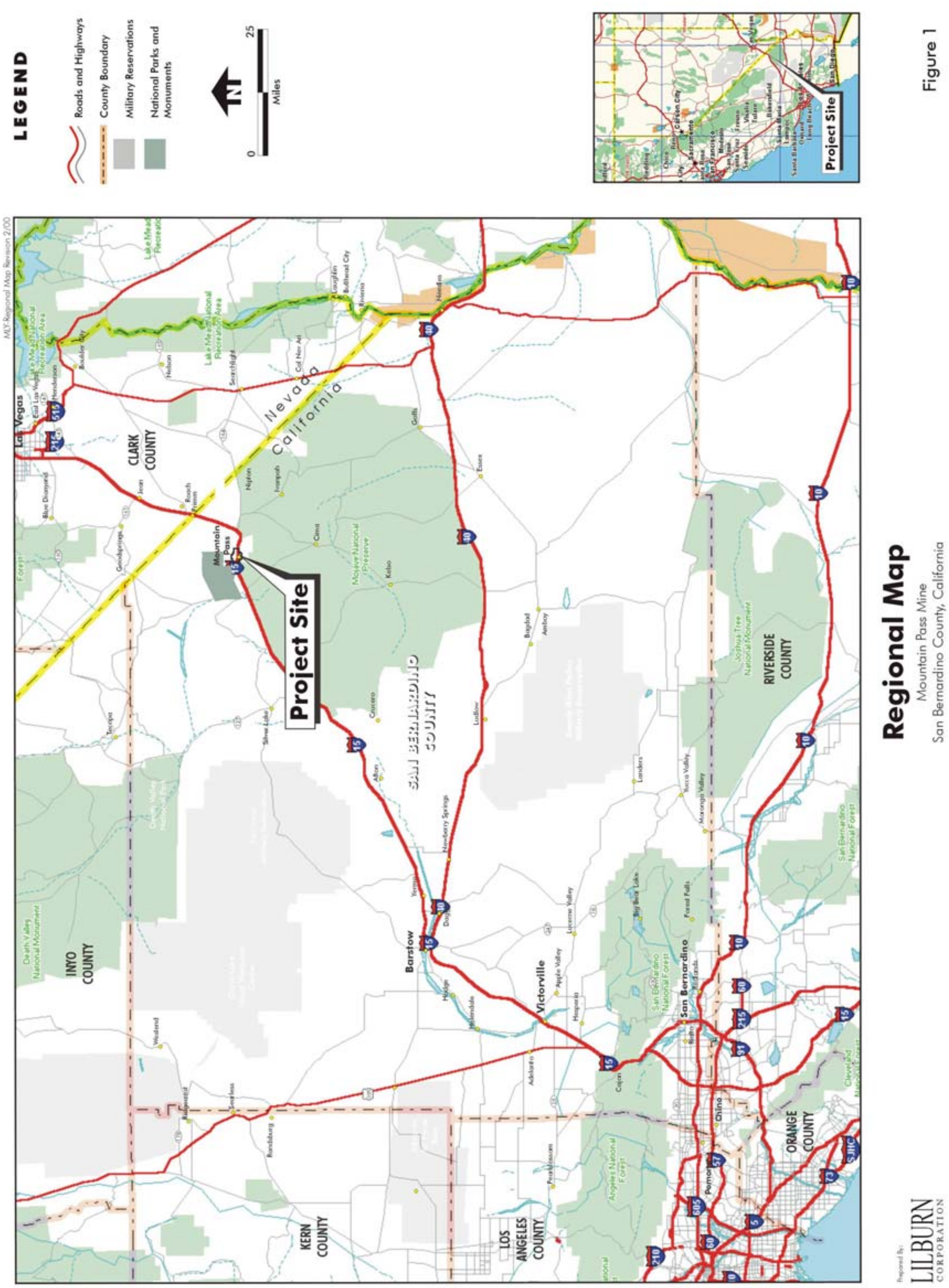
INTRODUCTION

Molycorp, Inc. operates a mining and mineral recovery facility known as Mountain Pass Mine, on approximately 2,222 acres located in northeastern San Bernardino County. The site is approximately 15 miles southwest of the Nevada-California stateline and 35 miles northeast of Baker, California, adjacent to Interstate 15 (I-15) (Figures 1 and 2). Currently, the facility is operating under a Reclamation Plan approved by the County of San Bernardino in 1980 and revised in 2000 (see Appendix A), and vested rights related to pre-1976 operations.

Molycorp has a vested right to conduct surface mining operations pursuant to the California Surface Mining and Reclamation Act, Public Resources Code Section 2776 ("SMARA") and the San Bernardino County Development Code Section 812.22020. Molycorp and its predecessors have mined the lanthanide ore body at Mountain Pass since about 1951, prior to the enactment of SMARA and the County's Development Code. For additional detail, refer to Appendix B. The application submitted to the County of San Bernardino is for approval of a Conditional Use Permit (CUP) for the new tailings storage and onsite evaporation ponds; and a revised Reclamation Plan (Plan) for ongoing mining, stockpiling, and mineral recovery operations under its current production rates over the entire mine site including these two new facilities.

Mining, reclamation, and wastewater management activities associated with two, 15-year operational phases are described in this Plan and will occur during a 30-year period scheduled to begin when final Plan approval is received from San Bernardino County. Planned activities are based upon a technical, economical, and environmental assessment of available ore resources. For planning purposes, the development of the mine is engineered as a series of foreseeable stages that consolidates operations onsite and maximizes economic ore excavation and mineral recovery utilizing existing onsite facilities, equipment, and personnel. If operations are discontinued at the end of the 30-year period, final reclamation and revegetation will be initiated in conformity with SMARA. However, future exploration and mining activities may identify additional ore reserves that may extend the operational viability of the site past the discussed 30-year planning period. If this occurs, Molycorp's Reclamation Plan would be amended and updated, as necessary.

In the past, approximately 685 acres have been disturbed at the Mountain Pass Mine. An additional 268 acres will be disturbed as a result of ongoing, vested operations associated with the 30-year plan and 374 acres will be disturbed by the East Tailings Storage Area and the Northwest Evaporation Ponds under the CUP. The existing and proposed disturbed lands total approximately 1,327 acres and are shown on Figure 3 and listed in detail in Table 1.


LEGEND
Roads and Highways
County Boundary
Military Reservations
National Parks and Monuments
0
25
Miles
Project Site
Las Vegas
CLARK COUNTY
Nevada
California
Mountain Pass
Mojave National Preserve
SAN BERNARDINO COUNTY
INYO COUNTY
KERN COUNTY
LOS ANGELES COUNTY
ORANGE COUNTY
RIVERSIDE COUNTY
Barstow
Victorville
San Bernardino
Chino
Pomona
Regional Map
Mountain Pass Mine
San Bernardino County, California
Figure 1
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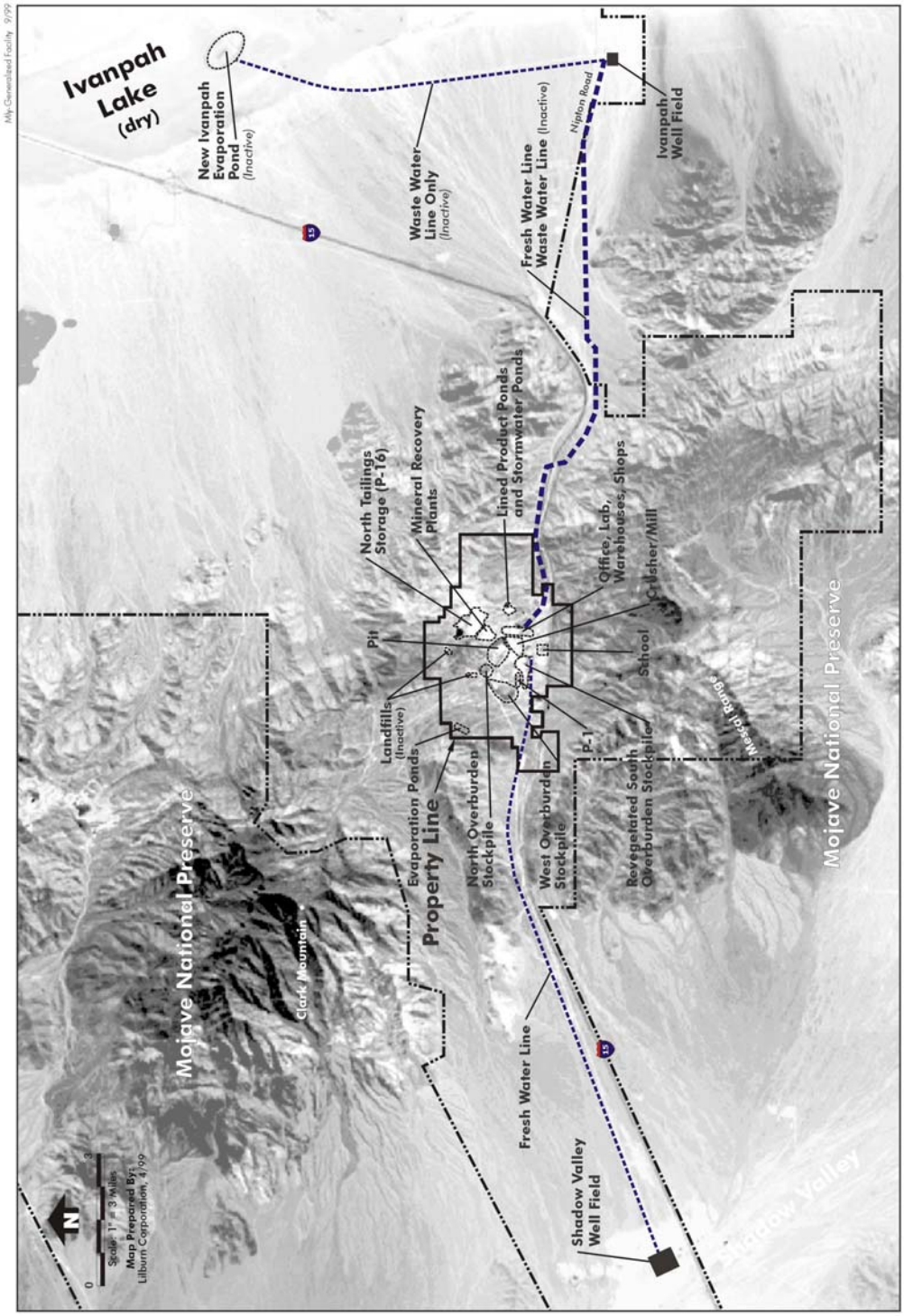

General Facilities Map

Mountain Pass Mine
San Bernardino County, California

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Figure 2

1-3

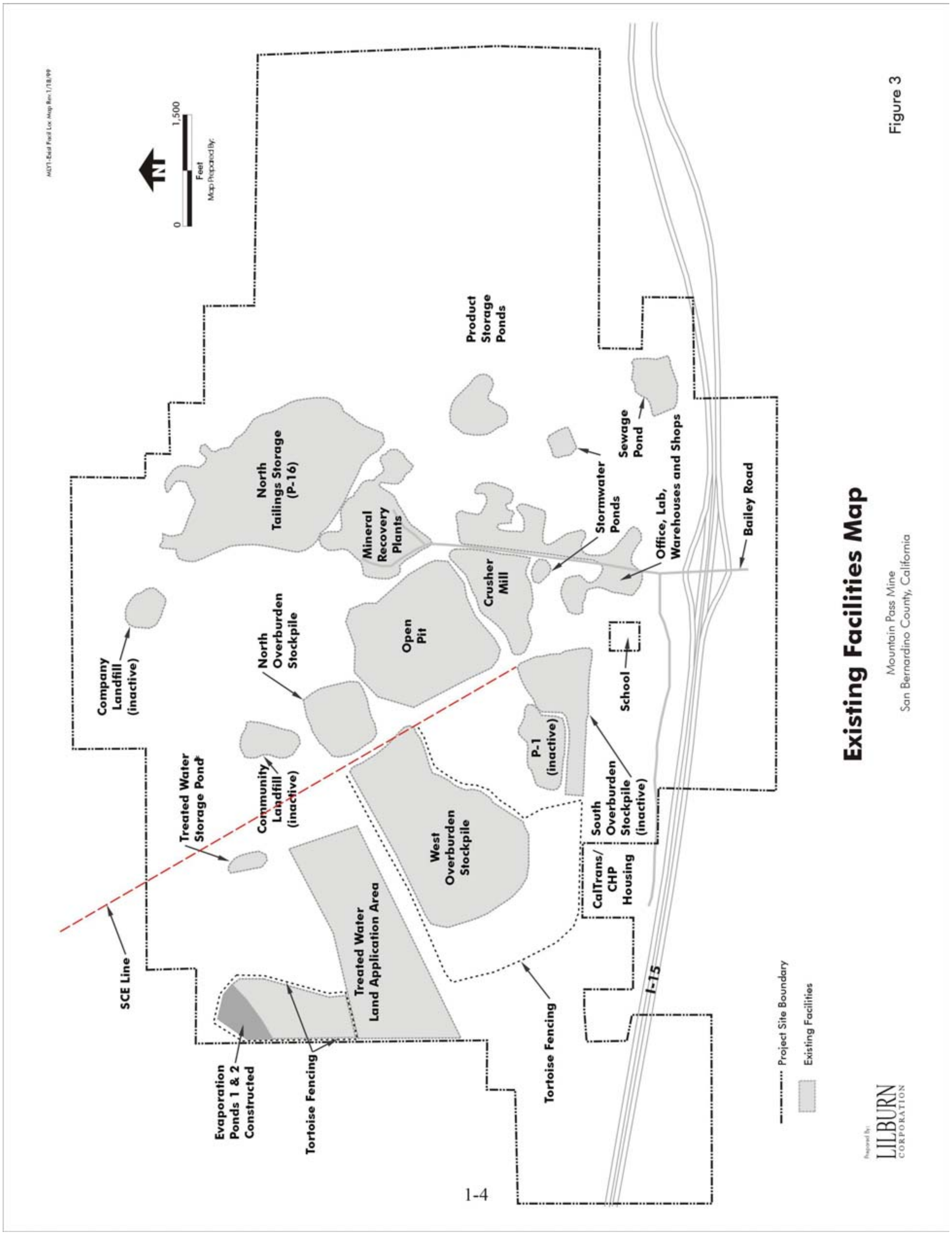

Existing Facilities Map
Mountain Pass Mine
San Bernardino County, California
Figure 3
Feet
0
1,500
North Tailings Storage (P-16)
Product Storage Ponds
Sewage Pond
Mineral Recovery Plants
Stormwater Ponds
Office, Lab, Warehouses and Shops
Bailey Road
Crusher Mill
Open Pit
North Overburden Stockpile
Company Landfill (inactive)
School
P-1 (inactive)
South Overburden Stockpile (inactive)
Community Landfill (inactive)
Treated Water Storage Pond
West Overburden Stockpile
CalTrans/ CHP Housing
Treated Water Land Application Area
SCE Line
Tortoise Fencing
Evaporation Ponds 1 & 2 Constructed
I-15
Project Site Boundary
Existing Facilities
LILBURN CORPORATION
1-4

TABLE 1
EXISTING AND PLANNED NEW SURFACE DISTURBANCE
AT MOUNTAIN PASS MINE

Component	Existing Area by Component (in acres)	Planned New Disturbed Area by Component[1] (in acres)	Notes
Open Pit Mine	55	20	Includes 20 undisturbed acres, plus 8 acres of the existing mill/flotation/crusher area and 35 acres previously disturbed adjacent to stockpile areas
West Overburden Stockpile Area	70	87	Enlarge stockpile to include 3 acres of P-1 and undisturbed area around existing West Stockpile
North Overburden Stockpile Area	18	124	Includes new area plus existing inactive landfill areas of approximately 12 acres minus about 9 acres lost to pit expansion
South Overburden Stockpile Area	21	0	No change in area
North Tailings Storage Area (P-16)	70	0	No change in area
West Tailings Storage Area (P-1)	14	0	Inactive Pond to be closed; 3 acres of P-1 converted to West Overburden Stockpile Area
East Tailings Storage	0	222[3]	Generally undisturbed area
Mill/Flotation Plant and Crusher Area	20	6	Relocate to new 6-acre site north of existing plants. Approximately 8 acres of existing area absorbed into expanded pit. Remaining 12 acres become Support/Misc. facilities
Mineral Recovery Plants	27	0	1 acre used for mill/flotation plant relocation
Offices, Support Buildings, and Misc.	30	0	Includes additional 12 acres from existing mill/flotation plant area due to its relocation
Product/Storage Ponds	11	0	No change in size
Northwest Evaporation Ponds	40	133[3]	Two ponds constructed in 2000-01. Planned ponds (136 ac) minus 3-acre treated water pond
Stormwater Ponds	16	0	No change in size
Soil Stockpiles	0	16 14[3]	Three semi-permanent soil stockpiles
Company and Community Landfills	12	0	Landfills will be covered by the North Overburden Stockpile Area
Roads	42	15 5[3]	New roads to serve proposed facilities and East Tailings Storage Area
Miscellaneous Areas	239	0	Past and existing disturbed areas and closed ponds not categorized under above components.
Total Area	**685**	**268[2]** **374[3]**	Total Planned Disturbance – 1,327 acres

1 Refer to Figure 3 for Existing Disturbance and Figure 10 for Planned New Disturbed Areas.
2 Vested Areas.
3 New Disturbed Areas part of the CUP. Total: 374 acres Source: Molycorp, Lilburn Corp., August 2002

A summary of basic information for the Reclamation Plan application is provided below.

Land Owner and Applicant/Operator:	Molycorp, Inc. 67750 Bailey Road P.O. Box 124 Mountain Pass, CA 92366 (760) 856-2201
Representative:	Lilburn Corporation 1905 Business Center Drive San Bernardino, CA 92408 (909) 890-1818
Planned Operating Period:	30 years from date of approval – Years 1 - 30 (Note: Future exploration and mining activities could provide information about additional ore reserves which could lead to the continued operational viability of the site past the discussed 30-year planning period.)
Planned Reclamation Period:	10 years – Years 31 through 40 for reclamation and revegetation 30 years per CCR Title 27 for post-closure maintenance and monitoring of closed mine waste management units (including the tailings storage areas and ponds), or when the RWQCB determines that water quality aspects of reclamation are complete and the closed waste management unit does not pose a threat to water quality

MOUNTAIN PASS MINE PRODUCTS

The Mountain Pass Mine is one of the world's primary sources for lanthanides and the only commercial deposit of this type in the United States. For the past 50 years, Molycorp and its predecessors have mined the lanthanide orebody and recovered bastnasite, the mineral of interest, which contains 14 individual lanthanide elements. The lanthanide elements have a number of energy, environmental, and lighting applications. Cerium, one of three high-volume products, is used as an automobile exhaust gas clean-up catalyst. Cerium and bastnasite concentrates are widely used in the glass industry as decolorizing and clarifying agents, in the manufacture of polishing agents, and as anti-browning agents and ultraviolet absorbers in television face-plate glass. Purified mixed lanthanum concentrate is used in the manufacture of nonlead batteries and also in the manufacture of catalyst for cracking petroleum crude to increase the yield of gasoline and other petroleum products. Europium is used in phosphor manufacturing for high-efficiency lighting applications. Yttrium and europium are used for color television phosphor. Additional product information is included in Appendix C.

Demands for the lanthanide elements fluctuate often. As a result, the facility's operations must be flexible. This is due to the fact that many markets for these elements are under development and new uses for lanthanides are being identified as research advances. The facility's basic operations (e.g., mining, milling, roasting, acid leaching, solvent extraction, filtration, and calcining/drying) remain constant; however, different reagents, operating flows, and operating parameters may vary.

1.1 MINING OPERATIONS

1.1.1 History

Exploration, combined with property acquisition, led to the development and utilization of the Mountain Pass orebody as the only deposit of its kind in the Western Hemisphere mined solely for lanthanides. The Mountain Pass Mine is a major supplier of lanthanide products in the United States and throughout the world. A brief discussion of the history related to development of the site is provided below.

The historic Clark Mining District was organized in 1865 primarily for silver mining. Between 1900 and 1920, many small lead, zinc, copper, gold and tungsten mines were started and some production recorded. The Sulphide Queen gold deposit, adjacent to the Mountain Pass orebody, was discovered in 1936. Although a 100-ton cyanide plant was built, only small amounts of gold were produced.

Although considerable mineral exploration in the Clark Mountain area occurred prior to 1949, the presence of lanthanides was not suspected until Herbert Woodward discovered a heavy, light-brown mineral on mining claims located nearly a mile north of the Sulphide Queen gold mine. The U.S. Bureau of Mines later identified the mineral as bastnasite, a fluoro-carbonate of the cerium group of rare earth (lanthanide) elements. Later the U.S. Geological Survey (USGS) confirmed the identification of bastnasite (independently of the U.S. Bureau of Mines), as the major lanthanide mineral. Following this confirmation, USGS began geological mapping of the Birthday claims in November 1949 and a public announcement by the Secretary of the Interior was released.

In 1950-1951, Molybdenum Corporation of America optioned the Birthday claims in anticipation that the claim contained a domestic source of lanthanide elements. Following various exploratory efforts, titles were obtained for a high-grade ore body identified in an outcrop to the southwest, averaging 5 to 8 percent lanthanide elements.

The Concentrating Plant began operation in February 1952, and a dormitory was erected and mobile home facilities for the employees were provided. Flotation metallurgy began in January 1953, and later that year a water pipeline from Ivanpah Valley was put into service. In 1965, as a result of an increase in demand for europium as a red phosphor for color television, a new Europium Plant was constructed. Also that year, excavation for a new concentrating plant began and the Lahontan Regional Water Quality Control Board (RWQCB) established discharge

requirements for the onsite tailings pond. A new tailings facility (the North Tailings Storage Area – P-16) was constructed in 1967 and the Specialty Plant was constructed in 1981.

On November 14, 1994, Molycorp and the BLM completed a land exchange in which approximately 879 acres of public land at the Mountain Pass Mine were exchanged for 1,760 acres of private lands. The private lands included 1,280 acres of critical desert tortoise habitat in the Chemehuevi Valley and 480 acres within the Johnson Valley Off Highway Vehicle Open Area. The BLM's 1994 Decision Record concluded that the private land resource values and the public objectives served, were more significant than the public land resource values if retained in Federal ownership. It was also determined that the exchange would not conflict with established management objectives on adjacent Federal lands.

1.1.2 Geology

The Mountain Pass Mine site overlies a block of metamorphic rocks of Precambrian age that are bounded on the east and south by alluvium that extends into the Ivanpah Valley. This block is bounded by the Clark Mountain fault, which delineates a line along which volcanics and sedimentary units of Paleozoic and Mesozoic age occurred to the west. The northern boundary of the site is marked by a conspicuous transverse fault. The Precambrian metamorphic complex is comprised of a large number of varied lithologic types such as: garnetiferous mica gneisses and schists; biotite-garnet-sillimanite gneiss; hornblende gneiss and schist; amphibolite, biotite gneiss and schist; granite gneisses and migmatites; granitic pegmatites; and minor amounts of foliated mafic rocks.

The lanthanide-bearing carbonatite rocks are spatially related to potash-rich igneous rocks of Precambrian age that cut the metamorphic complex. The larger potash-rich intrusive masses, 300 or more feet wide, constitute one granite, two syenite and four composite shonkinite-syenite bodies. One of the shonkinite-syenite stocks is 6,300 feet in length. Several hundred relatively thin dikes of potash-rich rock range in composition from biotite shonkinite through syenite to granite. Although a few thin and fine grained shonkinite dikes cut the granite, the mafic intrusive bodies are generally the oldest, and granitic rocks the youngest. The precambrian rocks are intruded by east-trending tertiary andesitic dikes which have been displaced by younger faults.

Veins of carbonatite rocks are most abundant in and near the southwest side of the largest shonkinite-syenite body. Most veins are less than six feet thick. Although around 200 veins have been mapped in the district, their aggregate surface area is probably less than one-tenth of the large carbonatite ore deposit (Olsen et al 1954).

1.1.3 Ore Deposit

The lanthanide orebody at the Mountain Pass Mine contains about 40 percent calcite, 25 percent barite and/or celestite, 10 percent strontianite, 8 percent bastnasite, 8 percent silica, 3 percent monazite, and minor amounts of apatite, galena, and hematite. This carbonatite mass (dipping about 40° west) was intruded, much like an igneous sill, into Precambrian gneiss.

Bastnasite is tan to yellow-brown in color and generally occurs in tabular hexagonal crystals flattened on the base. In high-grade veins, such as those found on the Birthday claims, some crystals are as much as four inches in length while in the Sulphide Queen body, they are usually less than one-eighth of an inch long. The bastnasite ore body contains 14 lanthanide elements including cerium, lanthanum, praseodymium, neodymium, samarium, europium, and gadolinium.

1.1.4 Mining

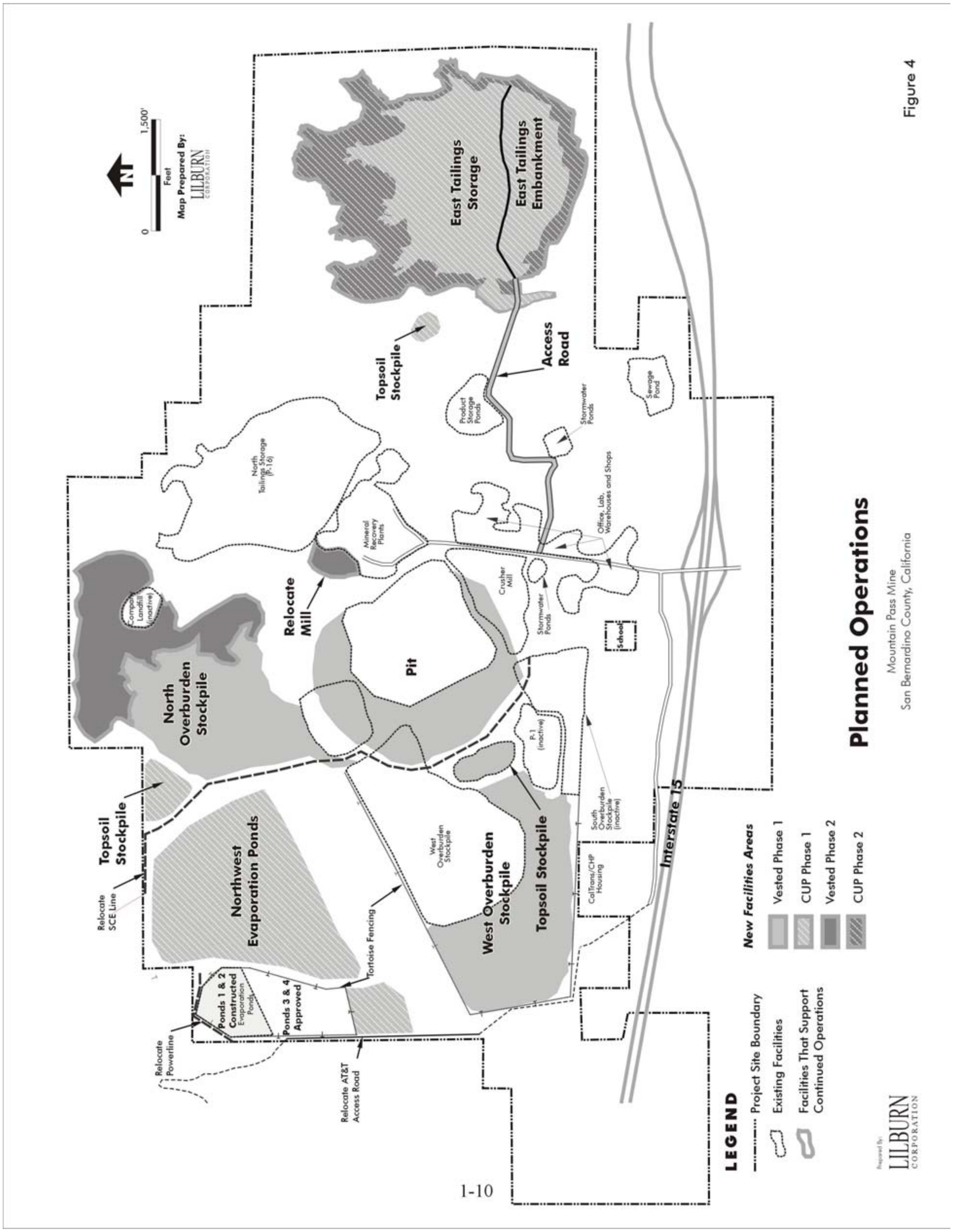
The open pit mine will be expanded from approximately 55 acres to 118 acres over the 30-year operational period to maintain the existing crusher and mill feed rate. Expansion will occur in 200-foot wide successive increments to approximately 2,800 feet north to south, 2,550 feet east to west, and deepened by about 420 feet to a total depth of approximately 770 feet. The pit perimeter at the end of this period would be approximately 8,100 feet with overall side slopes consistent with the approved slope stability analysis. The description of mining and planned expansions are depicted on Figures 4, 5, and 6 and Sheets 2 and 3.

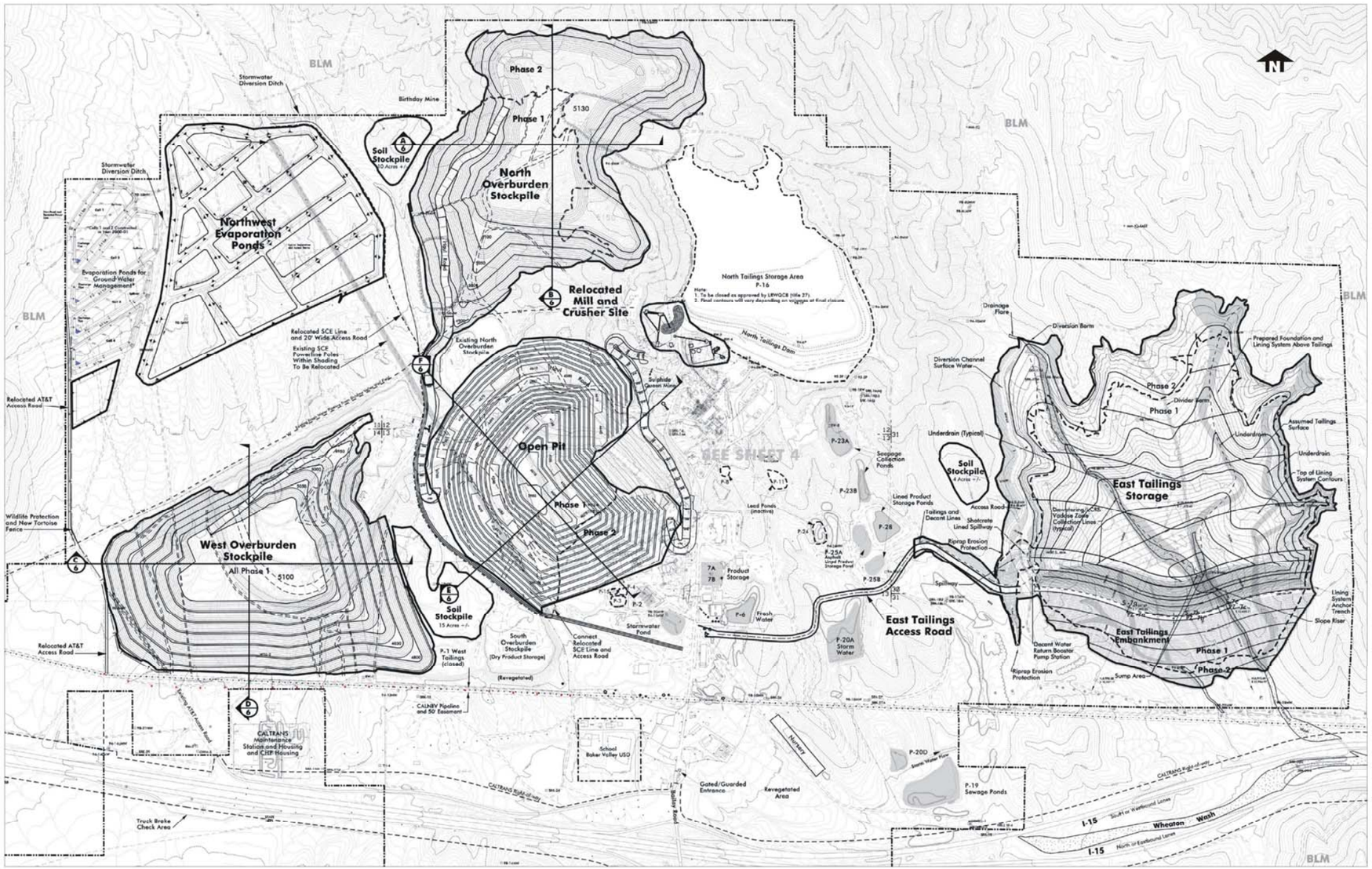
The maximum pit extent and the two phases planned are shown on Figure 6 and detailed on Sheet 3. Conventional open pit mining at Mountain Pass consists of expanding the pit by the slice method. Each slice from the pit wall removes overburden (non-ore bearing or barren rock) to expose the underlying ore and deepens the pit one layer (bench) at a time. The benches are developed by drilling, blasting, and loading the broken rock into haul trucks for transport to the crusher and the overburden stockpiles. Figure 7 provides a schematic diagram of the mine pit development and Figure 8 shows a photograph of the existing pit. A typical mining slice is about 200 feet wide by 1,200 feet long. Excavations are advanced using 60-foot vertical slopes at 0.5H:1V with 30 to 35-foot wide benches for an overall bench slope of 1H:1V (see Figure 9).

The bastnasite ore body dips about 40^{o} west from the surface to a depth of over 1,200 feet. As excavations increase in depth to follow the ore body, the amount of overburden will increase accordingly (see Sheet 3 and Table 2). The current stripping ratio of overburden to ore is estimated at 4 to 1. This ratio increases to 8.6 to 1 during the first five years of operation until excavations turn south in Phase 2. Overburden is discussed further in Section 1.2.

The ongoing mining operations are expected to produce a minimum of 30 years of ore for the crusher and mill/flotation plant. Haul trucks will deliver the ore to the primary crusher, located southeast of the pit, at an average rate of 1,800 tons per day or an annual rate of 450,000 tons for the first five years. Use of tailings from either the North Tailings Storage Area or the planned East Tailings Storage Area (future) accounts for approximately 200 tons per day or 50,000 tons per year (i.e., an average of 10 percent) of the mill/flotation plant feed.

Depending on market demand, mining of fresh ore is proposed to increase to approximately 630,000 tons annually after year five with tailings use increasing to 70,000 tons, annually. Concurrently, overburden removal will occur at a rate of between 3,370 tons per day to 5,370 tons per day to expose the mineralized ore needed for operations.


Planned Operations
Mountain Pass Mine
San Bernardino County, California
Figure 4
Map Prepared By:
LILBURN CORPORATION
Feet
0
1,500'
TN
East Tailings Storage
East Tailings Embankment
Access Road
Topsoil Stockpile
Product Storage Ponds
Stormwater Ponds
Sewage Pond
North Tailings Storage (P-16)
Mineral Recovery Plants
Office, Lab, Warehouses and Shops
Relocate Mill
Crusher Mill
Pit
School
Company Landfill (inactive)
North Overburden Stockpile
Topsoil Stockpile
Northwest Evaporation Ponds
Relocate SCE Line
P-1 (inactive)
Topsoil Stockpile
West Overburden Stockpile
West Overburden Stockpile
South Overburden Stockpile (inactive)
CalTrans/CHP Housing
Interstate 15
Tortoise Fencing
Ponds 1 & 2 Constructed Evaporation Ponds
Ponds 3 & 4 Approved
Relocate Powerline
Relocate AT&T Access Road
LEGEND
Project Site Boundary
Existing Facilities
Facilities That Support Continued Operations
New Facilities Areas
Vested Phase 1
CUP Phase 1
Vested Phase 2
CUP Phase 2
Prepared By:
LILBURN CORPORATION
1-10



Mine Plot Plan

Mountain Pass Mine
San Bernardino County, California

Figure 5

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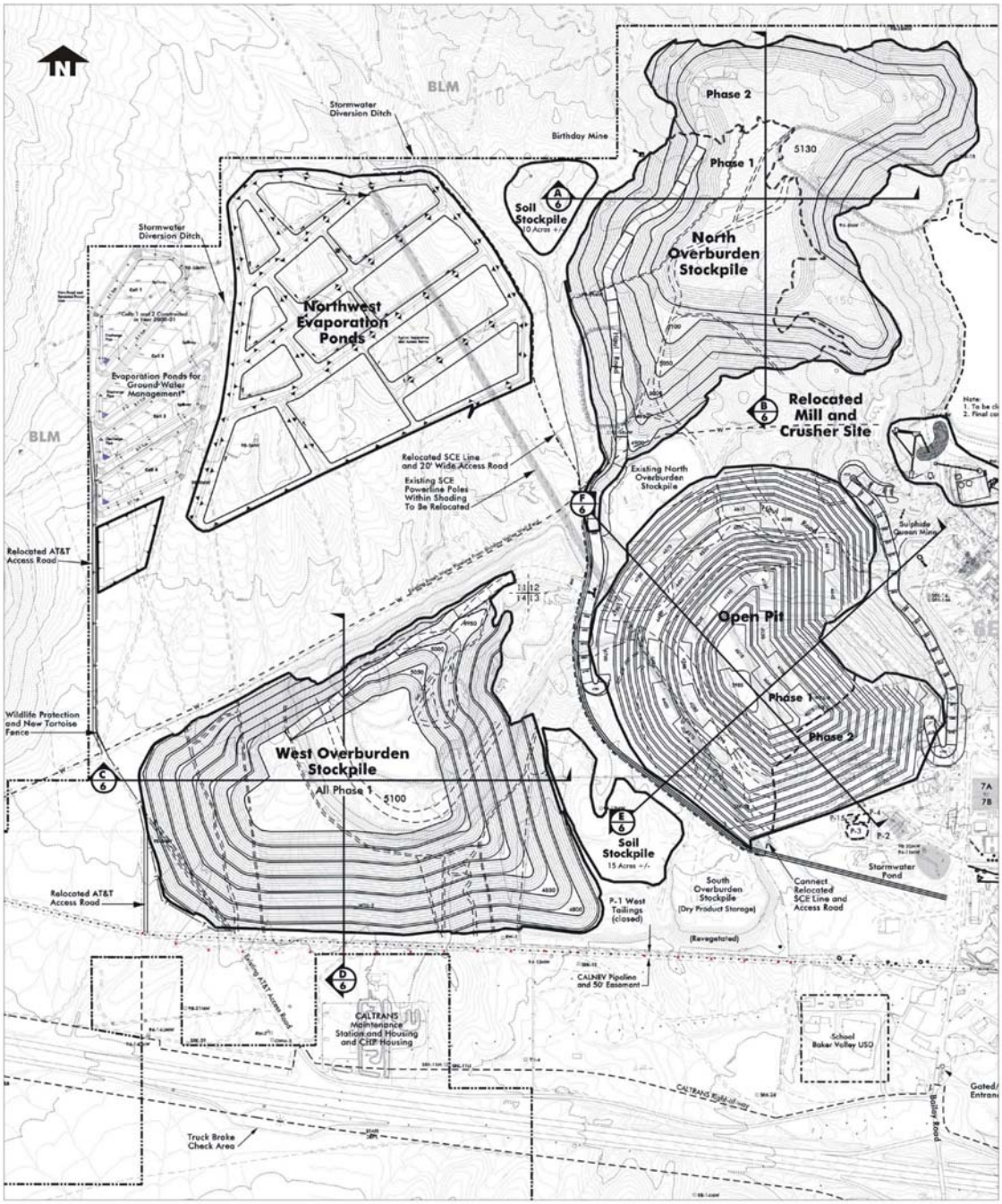
1-11



Mine Pit and Overburden Stockpiles Design

Mountain Pass Mine
San Bernardino County, California

Figure 6

1-12

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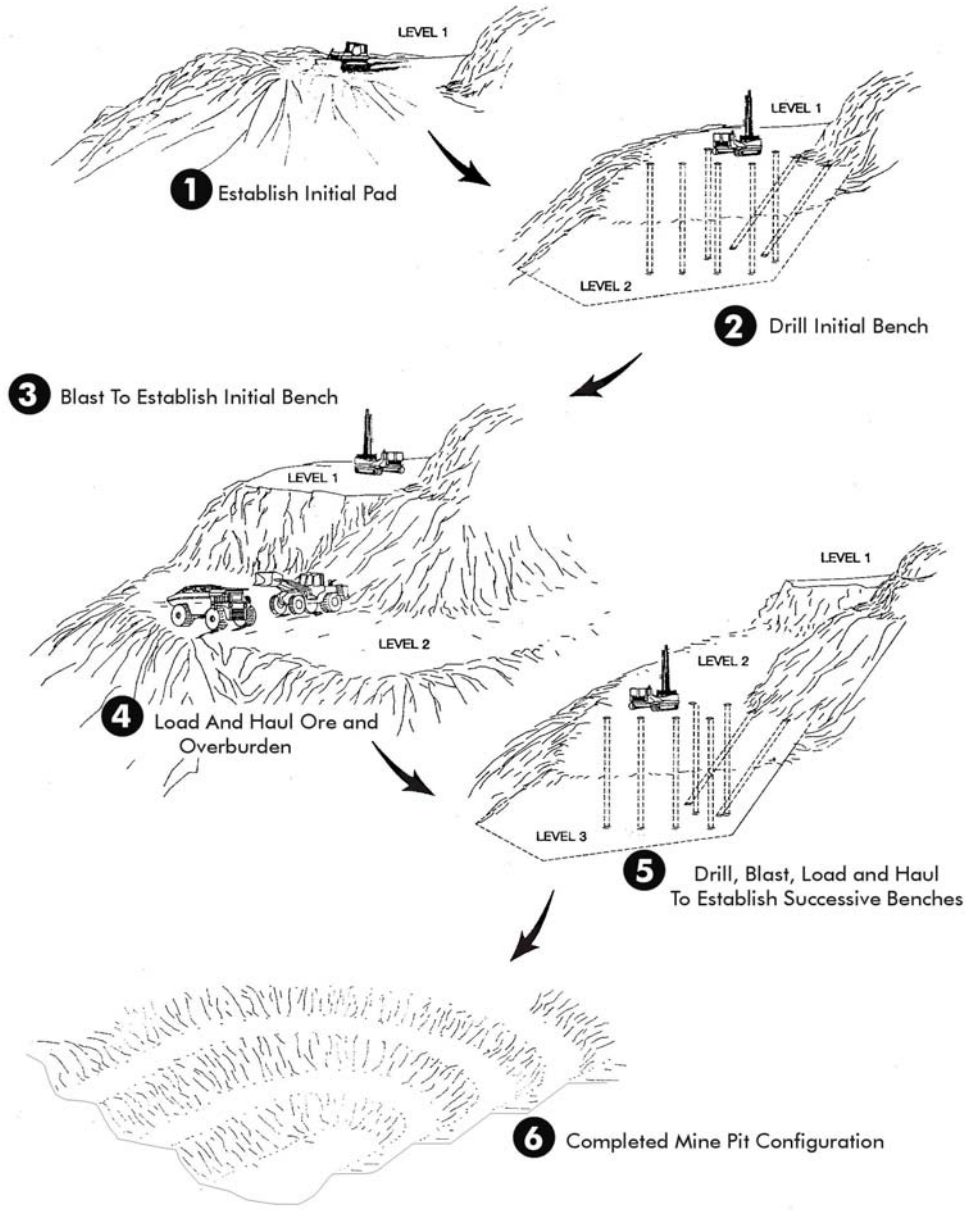

Mine Pit Development Schematic

Prepared By:
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Mountain Pass Mine
San Bernardino County, California

Figure 7

1-13

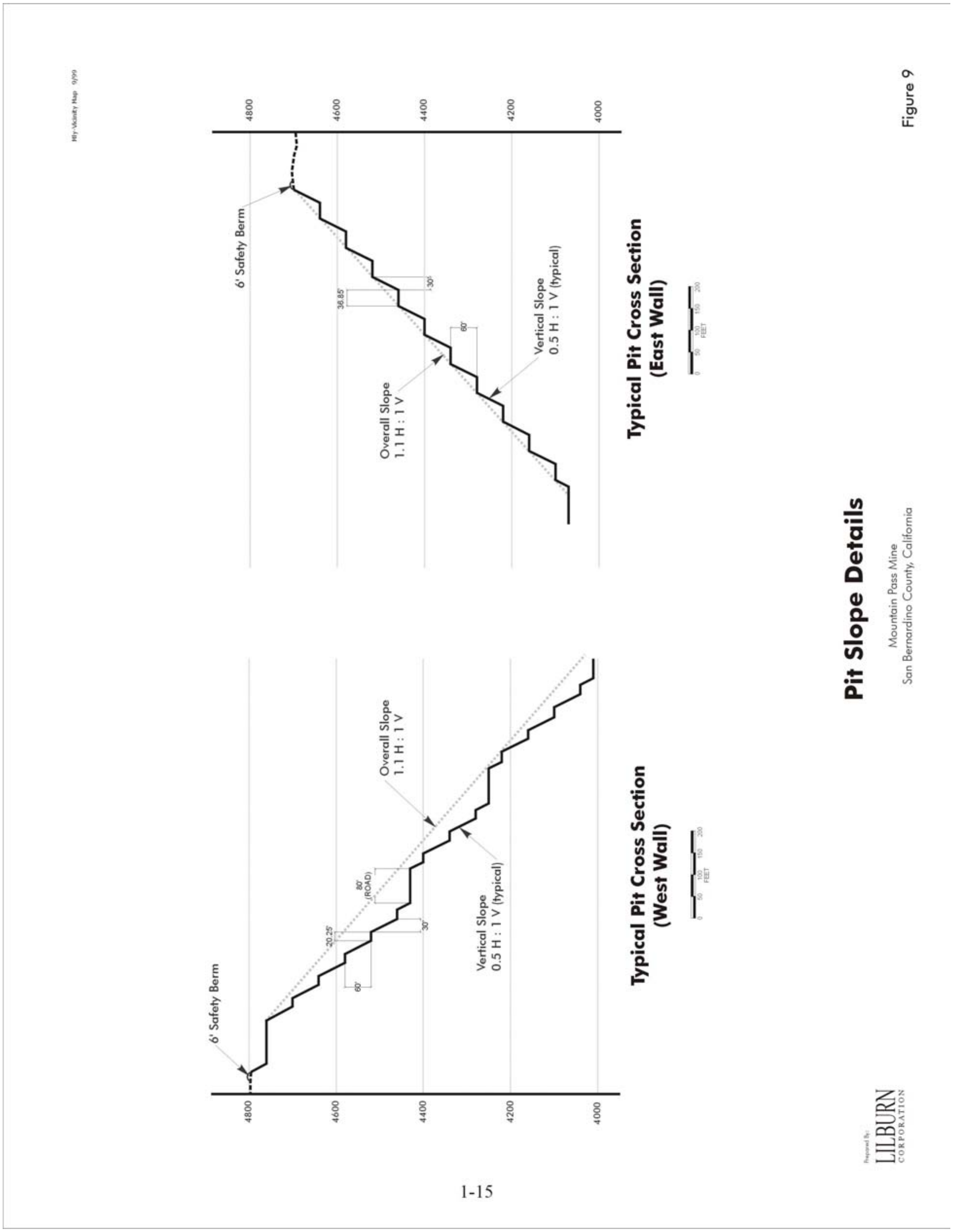
Mine pit development showing benches, loader at bottom of pit, drill rig on new bench, and haul truck.
View north and northeast.

Mine Pit Development Photograph

Prepared By:
LILBURN CORPORATION

Mountain Pass Mine
San Bernardino County, California
1-14

Figure 8


Pit Slope Details
Mountain Pass Mine
San Bernardino County, California
Figure 9
Typical Pit Cross Section
(West Wall)
Typical Pit Cross Section
(East Wall)
6' Safety Berm
Overall Slope
1.1 H : 1 V
Vertical Slope
0.5 H : 1 V (typical)
80' (ROAD)
20.25'
30'
60'
36.85'
4800
4600
4400
4200
4000
0 50 100 150 200
FEET
Prepared By:
LILBURN
CORPORATION
1-15

Although the daily ore requirements and mineral recovery rates are consistent with the present operations (i.e., under average operating conditions) and are not proposed to increase, the number of days of operation may be increased from 250 days per year through the first five years to 350 days thereafter. Table 2 provides an estimate of ore, overburden, and tailings generation during the 30-year period (by phase and year) in order to demonstrate changes in the stripping ratio. Actual annual production of ore and overburden will depend on operational considerations.

The crusher, mill/flotation plant, and associated facilities will remain in their present location for approximately 15 years or through Phase 1. Then, the crusher and mill/flotation plant will be relocated to an area north of the Separations Plant to facilitate pit expansion to the south (refer to Figures 5 and 11). The crusher will require approximately four acres, which will be installed on new foundations. The relocated mill/flotation plant will require approximately 3.25 acres. A new building will be constructed to house the dismantled, relocated mill/flotation equipment and an existing access road will be upgraded to accommodate the haul trucks.

Due to the size and nature of the deposit, mining utilizes conventional open pit techniques. A brief description of mine operations follows:

Drilling

Eight-inch diameter vertical blast holes are drilled by track-mounted drills into the rock in an evenly spaced pattern. A typical drill hole pattern consists of 100 holes, each 34 feet deep. Material from each drill hole is sampled and assayed to determine the quality of the ore material.

Blasting

The drill holes are loaded with low velocity explosives and timed to ignite in a specific sequence. The blasts are designed to break the rock in a safe, efficient, and cost-effective manner. The blast is timed by placing a non-electric, millisecond delayed blasting cap connected to an ignition cord and a one-pound cast priming booster in each drill hole. The drill hole is then loaded with a predetermined amount of explosives and filled to the surface with crushed rock, leaving the end of the ignition cord exposed. The ends of the ignition cords are connected together with detonation cords. The blast is ignited from a protected area using another length of detonation cord leading to the blast. Licensed Molycorp employees design and install the materials needed to time the blast. The explosive agents are provided by a licensed explosives supply contractor. Explosives are stored in an area isolated and protected from active operational areas. This storage area is currently located on the North Overburden Stockpile but will be relocated prior to transfer of overburden to this stockpile.

Loading

The blasted rock is loaded with front-end loaders into mine haul trucks and transported from the open pit over roads sloped on an average 10 percent grade. The final destination of the rock is determined by its mineral content. Broken rock of ore grade is crushed for milling while the non-ore bearing rock is placed in nearby overburden storage areas west of the open pit mine. Low grade ore is separately stockpiled for ore blending or future beneficiation.

TABLE 2
ESTIMATED THIRTY YEAR ORE, OVERBURDEN, AND TAILINGS GENERATION
(1,000s of Tons)

Year	Annual Tons (1,000s of tons)					Cumulative Tons (1,000 of tons)			Overburden to Ore Stripping Ratio	
	Crusher/Mill Feed									
	Ore	Tailings to Mill	Total Mill Feed	Tailings to Pond	Overburden	Ore	Tailings to Pond	Overburden	Annual	Cumulative
Phase 1										
1	450	50	500	465	3,300	450	465	3,300	7.3	7.3
2	450	50	500	465	4,050	900	930	7,350	9.0	8.2
3	450	50	500	465	4,050	1,350	1,395	11,400	9.0	8.4
4	450	50	500	465	4,050	1,800	1,860	15,450	9.0	8.6
5	450	50	500	465	4,050	2,250	2,325	19,500	9.0	8.6
6	630	70	700	651	3,870	2,880	2,976	23,370	6.1	8.1
7	630	70	700	651	5,370	3,510	3,627	28,740	8.5	8.2
8	630	70	700	651	5,370	4,140	4,278	34,110	8.5	8.2
9	630	70	700	651	5,370	4,770	4,929	39,480	8.5	8.3
10	630	70	700	651	5,370	5,400	5,580	44,850	8.5	8.3
11	630	70	700	651	5,370	6,030	6,231	50,220	8.5	8.3
12	630	70	700	651	3,370	6,660	6,882	53,590	5.3	8.0
13	630	70	700	651	3,370	7,290	7,533	56,960	5.3	7.8
14	630	70	700	651	3,370	7,920	8,184	60,330	5.3	7.6
15	630	70	700	651	3,370	8,550	8,835	63,700	5.3	7.5
Phase 2										
16	630	70	700	651	3,370	9,180	9,486	67,070	5.3	7.3
17	630	70	700	651	4,208	9,810	10,137	71,278	6.7	7.3
18	630	70	700	651	6,126	10,440	10,788	77,404	9.7	7.4
19	630	70	700	651	4,730	11,070	11,439	82,134	7.5	7.4
20	630	70	700	651	2,926	11,700	12,090	85,060	4.6	7.3
21	630	70	700	651	2,158	12,330	12,741	87,218	3.4	7.1
22	630	70	700	651	1,938	12,960	13,392	89,156	3.1	6.9
23	630	70	700	651	1,692	13,590	14,043	90,848	2.7	6.7
24	630	70	700	651	1,608	14,220	14,694	92,456	2.6	6.5
25	630	70	700	651	1,540	14,850	15,345	93,996	2.4	6.3
26	630	70	700	651	1,178	15,480	15,996	95,174	1.9	6.1
27	630	70	700	651	1,044	16,110	16,647	96,218	1.7	6.0
28	630	70	700	651	916	16,740	17,298	97,134	1.5	5.8
29	630	70	700	651	755	17,370	17,949	97,889	1.2	5.6
30	630	70	700	651	577	18,000	18,600	98,466	0.9	5.5

Source: Molycorp, Independent Mining Consultants, Lilburn Corporation 2002

Note: This table shows stripping rates and ratios based on an average daily crusher/mill feed of 2,000 tons for 250 days annually for the first five years and a maximum of 350 days per year for the remaining years. The crusher/mill feed is estimated at 90% ore and 10% from tailings reuse. Tailings generation is estimated at 93 percent of each ton of crusher/mill feed. This is a linear comparative analysis to demonstrate the increase in the estimated stripping ratio and overburden. Excavation rates will vary based on operational considerations.

Support equipment, such as water spray trucks, road graders, and bulldozers, are used to maintain the travel surfaces and loading areas used by other mining equipment. Typically, operations are conducted seven days per week, 52 weeks per year. Under normal operating conditions, the mine employs an average of 350 full time employees. The types of equipment and vehicles associated with operations at the site are listed below; however, the quantity and type of mobile equipment used at the site will change over the 30-year period to meet operational requirements.

2 motor graders
29 forklifts
1 trencher
9 truck/boom cranes and manlifts
1 cement mixer truck
5 85-ton haul trucks
2 water trucks
55 pick-up trucks (various types-gasoline)
1 hydraulic shovel
2 drill rigs
10 loaders
4 track dozers
1 sweeper (gas)
4 road tractors
1 35-ton haul truck
1 20-ton compactor
11 service trucks
6 vans (gasoline)
2 fire trucks

1.1.5 Mine Phases

Mining and reclamation activities associated with two, 15-year operational phases will occur during a 30-year time span. Provided operations are discontinued at the end of the 30-year period, final reclamation and revegetation will be initiated and conducted over a period of 10 years with required post-closure maintenance and monitoring of waste management units for a 30-year period. Descriptions of the two operational phases are provided below. Reclamation, Phase 3, is discussed in Section 2.

Figure 4 identifies the mining components and phases on a recent aerial photograph and Figure 10 illustrates the planned New Disturbed vested and CUP areas in Phases 1 and 2. Table 3 provides a summary of the planned activities by phase and area.

During the 30-year operational period, the possibility of commercial aggregate sales will be considered. Should an economic market develop, limited utilization of overburden from the open pit or overburden stockpiles would be undertaken. Aggregate is needed in the surrounding area primarily for maintenance and new construction on I-15. In addition, construction companies may request to setup temporary construction facilities such as a portable aggregate processing plant, an asphalt plant, and a ready mix plant onsite. Molycorp has planned on two locations onsite for the set up of temporary construction facilities related to aggregate production. The primary site is located immediately adjacent and to the west and southwest of the mill. This site would provide good access with minimal aggregate movement from the source of the aggregate and for transfer of the aggregate to offsite construction sites. A second site could be established to the east of the office complex along the planned access road to the planned East Tailings Storage Area.

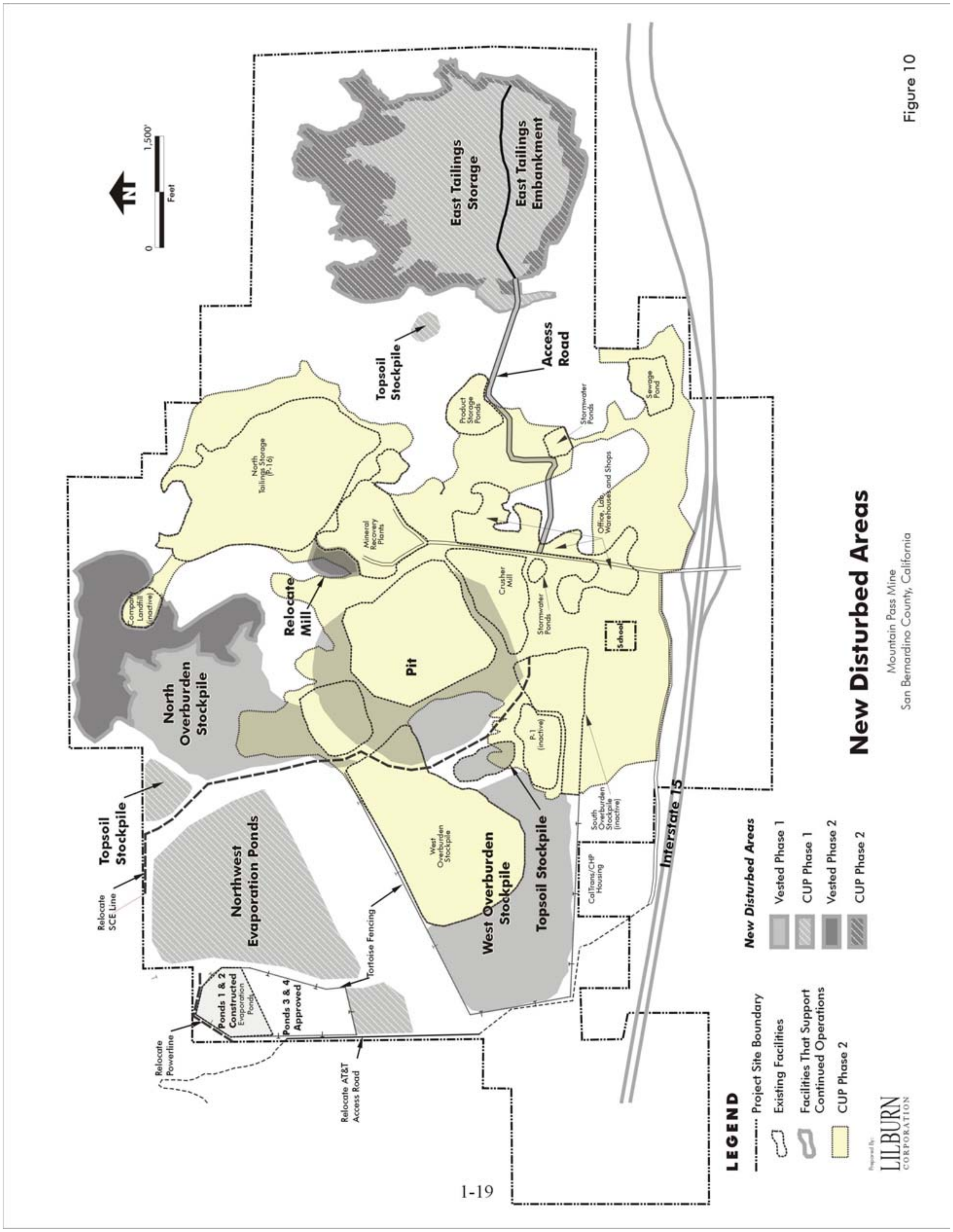

New Disturbed Areas
Mountain Pass Mine
San Bernardino County, California
Figure 10
LEGEND
Project Site Boundary
Existing Facilities
Facilities That Support Continued Operations
CUP Phase 2
New Disturbed Areas
Vested Phase 1
CUP Phase 1
Vested Phase 2
CUP Phase 2
Prepared By: LILBURN CORPORATION
Feet
0
1,500'
East Tailings Storage
East Tailings Embankment
Topsoil Stockpile
Access Road
Product Storage Ponds
Stormwater Ponds
Sewage Pond
North Tailings Storage (P-16)
Mineral Recovery Plants
Office, Lab, Warehouses, and Shops
Crusher Mill
Stormwater Ponds
School
Relocate Mill
Pit
Company Landfill (inactive)
North Overburden Stockpile
P-1 (inactive)
South Overburden Stockpile (inactive)
Interstate 15
Topsoil Stockpile
West Overburden Stockpile
West Overburden Stockpile
Topsoil Stockpile
CalTrans/CHP Housing
Relocate SCE Line
Topsoil Stockpile
Northwest Evaporation Ponds
Tortoise Fencing
Ponds 1 & 2 Constructed
Evaporation Ponds
Ponds 3 & 4 Approved
Relocate Powerline
Relocate AT&T Access Road
1-19

TABLE 3
CONTINUING OPERATIONS BY PHASE
(Estimated Acres)

Component	Existing Area	Phase 1 Years 1-15	Phase 2 Years 16-30	Total Footprint[1]	Phase 3 Reclamation
Open Pit Mine	55	51	12	118	Reclamation
West Overburden Stockpile Area	70	90	0	160	Reclamation
North Overburden Stockpile Area	18	61	66	145	Reclamation
East Tailings Storage Area	0	165[2]	57[2]	222[2]	Closure and Post-Closure Maintenance
Onsite Evaporation Ponds	40[3]	133[2]	---	173	Closure and Post-Closure Maintenance
Relocation of Mill/Flotation Plant and Crusher	20	---	6	6	Removal and Reclamation
Surface Material Stockpiles (areas move as pit expands and ponds are constructed in phases)	---	16 14[2]	Vary[4]	Vary[4]	Reclamation
Realign SCE Power Line through Project Site	4	6[5]	---	10	---
Construct New Access Roads	42	15 5[2]	---	62	Partially reclaimed
Total Areas	249[6]	239[7] 317[2]	84[7] 57[2]	---[1]	---

NOTES: Source: Molycorp, 2002

1. In some cases, total acreage in this column does not equal New Disturbed Areas as listed in Table 1 because some of the Total Footprint areas are presently disturbed by different existing uses.
2. CUP areas.
3. Two of four approved ponds constructed in 2000-2001.
4. Surface material stockpiles used for revegetation located on previously disturbed areas or within Phase 2 area.
5. Partially disturbed areas along existing access roads.
6. Denotes existing disturbed area project components only, not all onsite components as listed in Column 1 in Table 1.
7. Vested areas.

Variations for generation and distribution of aggregate material exist and include (1) crushing of the overburden at Mountain Pass and stockpiling the materials to be purchased by an aggregate supplier as needed; (2) stockpiling and selling uncrushed aggregate to a supplier; and (3) stockpiling and selling unprocessed aggregate to a supplier and allow supplier to crush with their mobile equipment onsite. The aggregate would consist solely of non-mineralized overburden that would be tested by the supplier to meet its particular job specifications.

Various air quality and other operational permits may be required for onsite generation of the aggregate by Molycorp. Any construction company or operator of the aggregate facilities would be subject to applicable permits from the County and other responsible agencies.

Utilizing the overburden for construction aggregate would be a good second use of this waste rock. The aggregate source would provide reasonably priced aggregate for future road construction and maintenance projects. The mine property would provide a temporary plant site with water, power, and direct freeway access. The aggregate supply could eliminate the need for other aggregate mines in this area reducing other offsite impacts.

Additionally, the use of tailings from the North Tailings Storage Area (P-16) and from the planned East Tailings Storage Area will continue. Currently, tailings are blended with ore at the proportion of 5 to 25 percent of total feed to the crusher. On average, tailings account for approximately 10 percent of the crusher and mill feed. Future volumes would vary based on the grade of ore available from the mine and the recoverable mineral value from the tailings, but are expected to range from 5 to 50 percent of total mill feed. This activity uses front-end loaders and haul trucks currently used at the mine.

Phase 1 – Years 1 through 15 Following Approval

Phase 1 of the mine and reclamation plan is scheduled for a 15-year period starting in approximately 2003 and continuing through 2017. This phase will expand the area required for mine and mineral recovery operations onto an additional 610 acres; of which 239 acres are vested operations and 371 acres are under the CUP. Additional reclamation activities will be initiated. (Note that some of the additional areas are presently disturbed.) The following activities are planned during Phase 1:

- Continue mining and increase the surface area of the existing open pit by approximately 51 acres;

- Increase the surface area of the existing West Overburden Stockpile Area by approximately 90 acres;

- Increase the surface area of the existing North Overburden Stockpile Area by approximately 61 acres;

- Construct approximately 78 acres of sized evaporation ponds within a 133-acre area in the northwest portion of the site to replace the New Ivanpah Evaporation Pond (part of

CUP). (Note: two of four approved ponds were constructed in 2000-01 on 40 total acres and are not part of the planned project);

- Construct the East Tailings Storage Area on approximately 165 acres in the east portion of the site to replace the existing North Tailings Storage Area (P-16) (part of CUP);

- Construct an access/haul road from Bailey Road east to the East Tailings Embankment;

- Realign existing Southern California Edison power lines that currently run northwest to southeast in the west half of the site to the east side of the Northwest Evaporation Ponds and between the West Overburden Stockpile Area and the pit;

- Salvage plants and stockpile surface material from the West Overburden Stockpile expansion, the Northwest Evaporation Ponds area, and the East Tailings Storage Area for ongoing and future reclamation; and

- Continue concurrent reclamation of existing disturbed areas. Surface material and plants will be used for reclamation and revegetation of the inactive South Overburden Stockpile, the inactive South Tailings Storage Area (P-1), lower reaches of the West Overburden Stockpile facing I-15, and other areas adjacent to the south and east sides of the facility.

Phase 2 -Years 16 through 30 Following Approval

The 15-year period between approximately 2018 and 2032 is designated as Phase 2 and would disturb approximately 141 acres. Activities planned during this phase include:

- Excavate the existing open pit to the south and southeast by approximately 12 acres;

- Increase the surface area of the North Overburden Stockpile Area by approximately 66 acres;

- Increase the East Tailings Storage Area and embankment by approximately 57 acres (part of CUP);

- Relocate the mill/flotation plant and crusher to the north of the Separations Plant, to facilitate southward pit expansion; and

- Continue concurrent reclamation of disturbed areas per Reclamation Plan.

Phase 3 – Final Reclamation (Years 31 – 40 Following Approval)

Phase 3 is the final reclamation phase, which is assumed to occur for approximately 10 years after mining operations are terminated. Detailed reclamation plans are included in Section 2 and are briefly summarized below:

- Final reclamation and revegetation of the North Overburden Stockpile Area;

- Closure, revegetation, and post-closure maintenance and monitoring of the East Tailings Storage Area and embankment;

- Closure, revegetation, and post-closure maintenance and monitoring of the onsite Northwest Evaporation Ponds (except for some ponds required to continue ground water remediation activities if needed);

- Decommissioning, removal, and remediation (if necessary) of onsite buildings and facilities as determined by the future use of the plant site at the time;

- Spreading of stockpiled surface material on areas to be revegetated; and

- Revegetation of disturbed surfaces and monitoring and remediation of revegetation efforts.

1.1.6 Exploration

Exploration activities on the property site are continuing to further delineate the major ore body and to discover and prove ancillary ore bodies. Activities include geological mapping, geochemical sampling, geophysical surveying, (ground magnetics, etc.), and drilling. Exploration activities planned for adjacent unpatented lode claims on BLM managed public lands would require Notices or Plans of Operations describing proposed exploration submitted to the BLM for review and approval.

1.1.7 Ongoing Remediation and Monitoring Activities

Remediation and monitoring activities are occurring onsite or on public lands administered by the BLM and NPS as part of the existing operations. These continuing activities are required to maintain compliance with various environmental regulations and RWQCB orders and are not part of the planned operations. These include the following, which are provided for the information of the reader:

- Ongoing ground water monitoring of the Mine & Mill Site and Old and New Ivanpah Ponds under RWQCB Order Nos. 6-91-836, 6-90-56, and 6-90-41, respectively;

- Implementation of a revised Ground Water Corrective Action Program for the Mine & Mill Site as determined according to RWQCB Cleanup and Abatement Order No. 6-98-19 and Board Order No. 6-00-101;

- Closure of the two inactive onsite landfills with post-closure maintenance and monitoring;

- Closure and reclamation of the existing wastewater pipeline and revegetation of the disturbed route across BLM and NPS lands;

- Closure of the former tailings pond P-1 as approved by RWQCB (WDR 6-00-74);

- Investigation, closure, remediation (if necessary), and ground water monitoring of the New Ivanpah Evaporation Ponds under RWQCB Cleanup and Abatement Order No. 6-98-20;

- Investigation and ground water monitoring associated with the Old Ivanpah Evaporation Pond under RWQCB Cleanup and Abatement Order No. 6-98-21; and

- Closure, reclamation, and monitoring of various inactive ponds used in previous operations for mineral recovery, as described in RWQCB Cleanup and Abatement Order No. 6-98-19.

1.1.8 Periods of Non-Operation

In the event that a period of extended non-operation is anticipated, SMARA requires the operator to submit an interim management plan to the County of San Bernardino within 90 days of the operation becoming idle. The interim management plan may remain in effect for a period not to exceed five years and may be renewed for another period not to exceed five years upon review by the County (PRC Ch. 9, Div. 2, §2770(h)). The following measures for securing the site and protecting public health and safety would be implemented.

Periods of Non-Operation for One Year or Less

- Areas of disturbance will be fenced as necessary for public safety. All fencing will be inspected regularly for signs of tampering or entry.

- Security personnel will be posted on a continuous basis and the guarded entry station will be maintained.

- The site and all onsite roadways will be restricted to entry only by personnel authorized by Molycorp.

- Buildings will be locked and the plant area secured and inspected daily for evidence of tampering, entry, and signs of unsafe conditions.

- Onsite hazardous material and storage areas will remain fenced and locked. The storage sites will be inspected weekly or immediately after a major storm or earthquake by appropriate Molycorp designated personnel for tampering, illegal entry, and general environmental and safety conditions. A log will be kept to this effect. All hazardous materials and wastes will be managed according to applicable regulations.

- Chemical and industrial wastes will be stored in a secured storage area, as required, and shipped to an appropriate disposal site in accordance with Federal, State, and County regulations. Oil and grease wastes will be collected and picked up by an approved recycling firm. All scrap materials, which are recyclable, will be stored in a scrap area until such time as it is used or recycled. Used tires will be returned to vendors for recycling.

- Maintenance and monitoring of the onsite revegetation program will continue.

- Drainage channels and stormwater ponds will be monitored to ensure that local runoff continues to be handled effectively.

- Continuation of ongoing remediation and monitoring as listed under Section 1.1.7 above.

- Financial assurances as required by the County of San Bernardino will be maintained through the period of non-operation.

Periods of Non-Operation Longer Than One Year

In the event that a period of non-operation for more than one year is anticipated or occurs, the following steps will be taken.

- Procedures for periods of non-operation for one year or less listed above will be implemented.

- Maintenance of a safety berm around the pit.

- Blocking of all access roads with boulders or locked gates into the pit, the tailings storage areas, and onto the West and North Overburden Stockpiles.

- Preparation of an annual inspection and mitigation monitoring and reporting plan. The inspection will include a report on compliance with the above stated measures and list all areas of non-compliance and corrective measures necessary for compliance. The inspection report will be conducted on or before a date specified by the County.

1.2 MINERAL RECOVERY ACTIVITIES

The following section summarizes the Mountain Pass mineral recovery operations at each onsite facility under normal operating conditions.

1.2.1 Mineral Recovery Facilities

The bastnasite ore undergoes numerous mineral recovery or beneficiation operations to produce rare-earth products of various purities. The facilities utilized, and operations conducted to further concentrate the ore are identified in Table 4.

TABLE 4
EXISTING MINE AND MINERAL RECOVERY FACILITIES

Facility	Operations
Mine Pit	• Drilling • Blasting • Loading/Hauling
Crushing Plant (to be relocated in Phase 2)	• Crushing • Screening • Dust Collection
Flotation Plant, including Small Mill Circuit and Large Mill Circuit (to be relocated in Phase 2)	• Milling • Grinding • Leaching • Conditioning • Flotation • Leaching/Precipitation • Filtering • Drying • Packaging • Dust Collection
Separations Plant	• Roasting • Acid Leaching • Thickening • Drying • Packaging • Solvent Extraction • Precipitation • Thickening • Filtering • Off-Gas Scrubbing & Dust Collection
Cerium 96 Plant	• Acid Leaching • Precipitation • Filtering • Drying • Packaging • Off-Gas Scrubbing & Dust Collection • Scrubber Neutralization Solution Preparation
Specialty Plant	• Dissolution • Evaporation • Precipitation • Solvent Extraction • Filtering • Drying • Calcination • Packaging • Off-Gas Scrubbing & Dust Collection
Other Support Facilities	• North Tailings Storage (P-16) • Onsite Evaporation Ponds • Treated Water Storage Pond • Crushed Ore Stockpiles • Inert Materials • Landfills (inactive) • Product Ponds • Overburden Stockpiles - West (active) - North (active) - South (inactive) • Office Building • Product Warehouses • Training Center • Post Office • Analytical Laboratory • Mobile Equipment Maintenance Shop • Utility Shop • Freshwater System • Domestic Sewage Pond

The general locations of the mineral recovery facilities are shown on Figure 11 and a general mineral recovery flow diagram of the concentration operations is included as Figure 12. A brief description of each operation is provided in this section.

Crushing/Screening Plant

The Crushing Plant is a three-stage unit consisting of a primary jaw crusher, a secondary hydrocone crusher, and a tertiary vertical rock-on-rock crusher. The ore and tailings are transported to the primary crusher feed stockpile by heavy equipment. A front-end loader is used to select feed from the stockpile area for placement into the crusher feed hopper. Management of the feed rate from the stockpiles produces mill feed blended to a uniform grade.

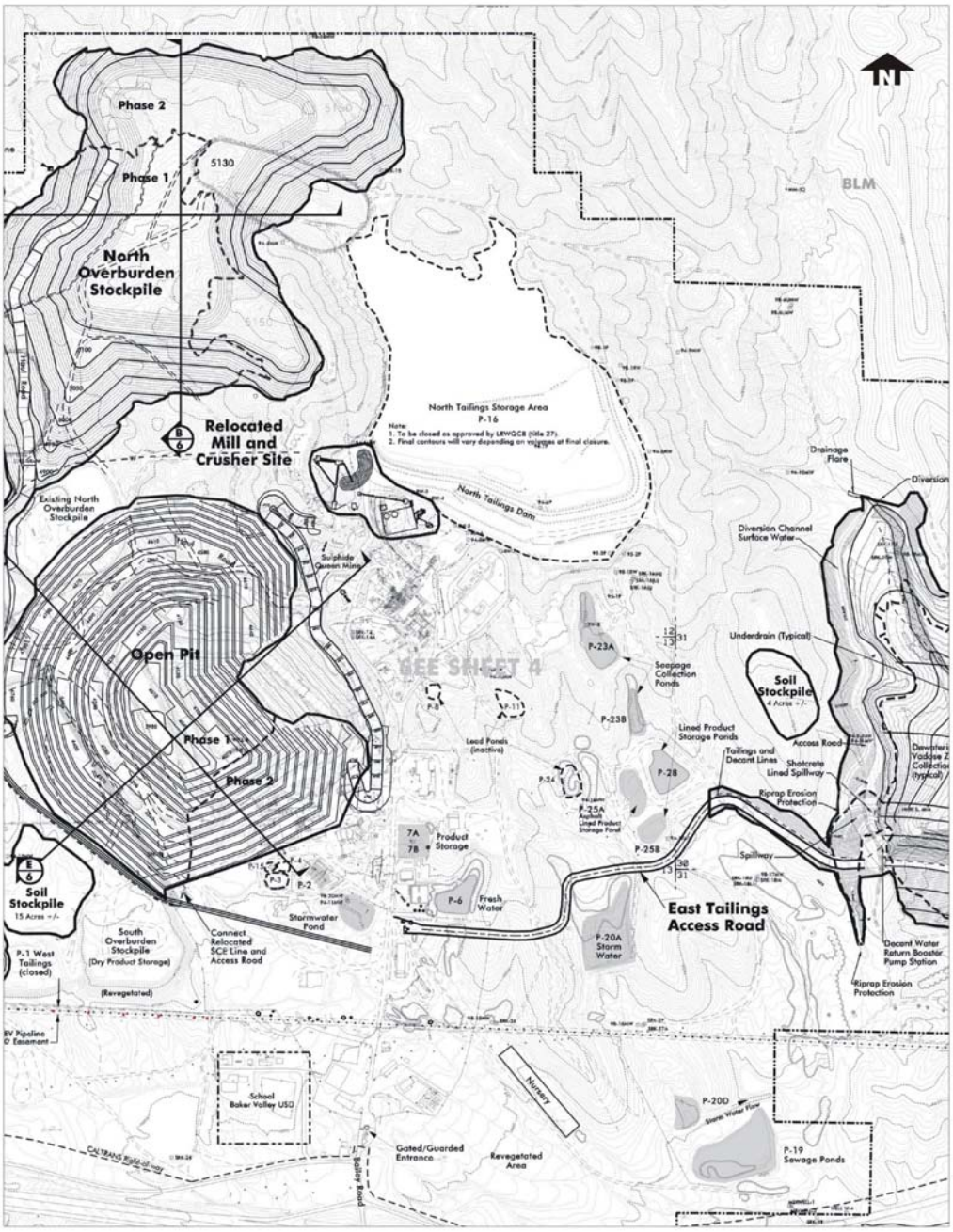
The primary crusher reduces ore to minus 6-inch material (material less than 6 inches in size), which is conveyed to a screening plant. The screening plant recirculates material to the secondary or tertiary crushers until all of the ore is crushed to minus 3/8 inch. The minus 3/8-inch material is transported to a conveyor system for deposition using a radial stacker conveyor to a stockpile for storage as mill/flotation plant feed. The crushed ore contains 7 to 9 percent lanthanide oxide (LnO).

Extensive provisions exist for dust control in the crushing plant. One baghouse dust collector is used to capture dust from the primary crusher's pan feeder, conveyor transfer points from the primary crusher to the transfer conveyor and the point where feed from the secondary and tertiary crushers discharge back onto the belt returning to the screening plant. A second baghouse dust collector is used to control dust at the transfer point to the screen tower, screen units, secondary and tertiary crushers and all transfer points on the conveying system. Additionally, water sprays are installed on the primary crusher dump hopper, all conveyor transfer points and a spray system is in place to wet the crushed ore as it is discharged to the crushed ore stockpile.

Mill/Flotation Plant

The minus 3/8 inch ore is conveyed to the mill/flotation plant where grinding with a ball mill produces a minus 100-mesh product. The discharge from the ball mill is prepared for flotation in four hot conditioning stages where reagents are added. Conditioned feed slurry is pumped to the flotation circuit to produce a 55 to 66 percent LnO concentrate for thickening, filtering, and drying. Depending on sales demands, this product can be further concentrated after the flotation circuit using a mild hydrochloric acid leach which dissolves carbonate gangue to yield a slurry with a 68 to 72 percent LnO value from which the solids are thickened, filtered, and dried.

Both leached and unleached bastnasite are sold as product. Typically, twenty percent of the bastnasite concentrate is packaged and sold while 80 percent of the concentrate is fed to the Separations Plant via bulk trucks. The milling and flotation operations are done as wet slurries and do not generate air emissions. The packaging, drying, and bulk storage bins are vented to permitted baghouses for dust control.



Mineral Recovery Facilities and Ponds

Mountain Pass Mine
San Bernardino County, California

Figure 11

Prepared By:
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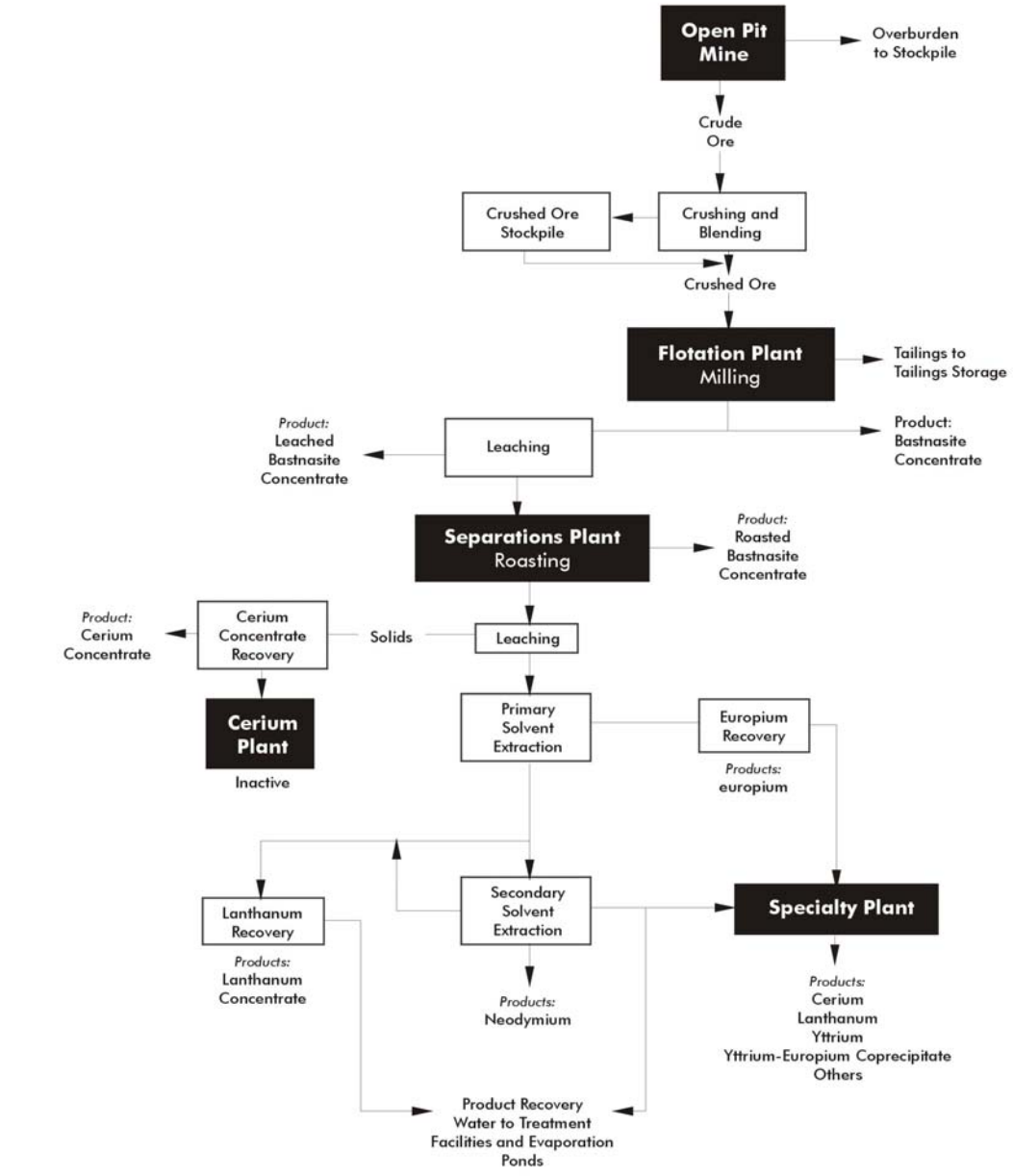
1-28



Source: Molycorp, 2001.

Mineral Recovery Operations Flow Diagram

Mountain Pass Mine
San Bernardino County, California

Prepared By:
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Figure 12

1-29

Primary waste generated in the crushing and mill/flotation operation is ore tailings slurry, which has been pumped via a pipeline to a lined portion of the North Tailings Storage Area (P-16). In the future, the tailings will be transported to the planned lined East Tailings Storage Area.

Separations Plant

Bastnasite is a complex fluro-carbonate mineral containing fourteen separate elements in the lanthanide series. The major gangue materials include barium sulfate, calcium and strontium fluro-carbonate. Minor constituents include iron, lanthanide phosphates (monazite) and lead sulfide (galena). As a result of the complexity of the ore, beneficiation of specific lanthanides must be undertaken in a series of steps. Initial concentration is performed in the Flotation Plant where a bastnasite concentrate is produced. This concentrate is fed to the Separations Plant where further separations of the lanthanides from gangue materials occurs. Various high-purity lanthanide oxide and carbonate products are generated at the Separations Plant including but not limited to, europium, lanthanum, cerium, and neodymium.

The initial beneficiation of the bastnasite concentrate at the Separations Plant involves a roast-leach step. Bastnasite concentrate is fed to a multihearth vertical roaster. After this roasting step, the bastnasite concentrate is fed to the Leach Circuit. Bastnasite concentrate can also be transferred to the Skinner Roaster or to packaging as Calcined Leached or Unleached Bastnasite. During the leach step, calcined bastnasite concentrate fed from the roaster is mixed with water and hydrochloric acid in a series of leach tanks equipped with agitators. Under the leach conditions employed, cerium and gangue tend to be insoluble while the other lanthanides tend to be solubilized as lanthanide chlorides. Following this separation, the slurry is fed to a thickener (tank). The overflow from the first thickener is neutralized and the slurry is then pumped to a series of thickeners. The underflow from the thickeners is pumped to a screen and filter for solids separation before being pumped to the tailings pond. The Iron Thickener overflow is transferred for solids precipitation and the thickener underflow is pumped to additional thickeners that are used to wash the non-cerium lanthanide chloride values using wash water. The washed solids are pumped to a filter for removal of liquids and then routed to an oil-fired rotary dryer. The final wash water is conveyed to the 204 Lanthanum Thickener.

Liquor overflow from thickeners feeds the Impurity Precipitation System that removes impurities from the feed used for SX-1. Impurities precipitate from solution in the first lead precipitation tank, overflow to the second precipitation tank, and then into the overflow sump which is pumped to a thickener. The underflow is pumped to a filter press for liquid removal and the resulting filter cake is packaged as a recyclable material or for off-site disposal. The associated thickener overflow is transferred to an overflow column prior to being pumped to the SX-1 Feed Storage Tank. After impurity removal, the leach solution is routed to one or more solvent extraction circuits (SX circuits) for additional separations. The raffinate stream (the original leach liquor less heavies) from SX-1 can be used as a feed stock for SX-2 Circuit or the Precipitation System.

The Purification Circuit further upgrades the pregnant solution to obtain high purity material (i.e., europium). In the SX-2 circuit, neodymium is separated from lighter lanthanides. The

raffinate from SX-2 is also pumped to the Precipitation System for recovery of lanthanide values. Raffinate from SX-1 or SX-2, as a bleed stream from SX-2 may be fed to the SX circuits at the Specialty Plant for additional lanthanide extraction.

The Precipitation System generates mixed lanthanide products from SX-1 and SX-2. Addition of reagents precipitates the dissolved lanthanides in solution. Upon exiting the final precipitation tank, the product is sent to one of two thickeners for impurity washing. The washed product underflow is then sent for filtering and drying. Several system configurations are available to allow for production of the various lanthanum products. Lanthanum products may also be sent to, or reclaimed from, lined storage ponds utilizing this equipment.

Off-gases and dust from the plant and its equipment are vented to permitted baghouses and scrubbers. Other wastes generated at the Separations Plant include SX Crud, a waxy by-product from the SX solvent, which consists of non-halogenated organics, non-halogenated organic phosphates, chlorides, and silica; waste lead sulfide; waste zinc; wastewater; and other typical plant wastes. Other wastes non-routinely generated include spent lubricants.

Cerium 96 Plant

Operations at the Cerium 96 Plant were discontinued in 1997. Feed for the Cerium 96 Plant is provided by the Separations Plant. Through utilization of acid leach, impurity removal steps, followed by precipitation, a high purity cerium carbonate material is produced. Products manufactured at the Cerium 96 Plant include dried and wet cerium products. Depending on market conditions and product demand, this plant and its equipment may be used in the future.

Specialty Plant

The Specialty Plant was built in 1980-81 for production of samarium oxide and gadolinium oxide. Since then it has been converted to other uses since production of samarium and gadolinium is not currently economically viable. At present, the Specialty Plant is being used to produce a variety of relatively small-volume products transferred to the Mountain Pass Facility after closure of Molycorp facilities in York, Pennsylvania and Louviers, Colorado.

There are three major products manufactured at the Specialty Plant, which consist of co-precipitated yttrium/europium oxide, yttrium oxide, and neodymium oxide. Other products manufactured at the Specialty Plant involve further processing of various Mountain Pass Facility products to change their physical and/or chemical forms. These include various lanthanide nitrate solutions, lanthanide acetate solutions, and flaked lanthanide chlorides.

Off-gases and dust from the plant and its equipment are vented to permitted baghouses and scrubbers. Wastes generated at the Specialty Plant include SX Crud, a waxy waste product from the SX solvent that consists of non-halogenated organics, non-halogenated organic phosphates, non-halogenated chlorides, and silica, and wastewater.

Product Storage Ponds

Various products and/or intermediate lanthanides are stored as slurries in lined ponds or in dry form on asphalt/cement pads located at the facility. The term "ponds" for some of these sites is a misnomer, as some "ponds" are actually concrete or asphalt pads used for dry product storage. Historical shifts in market conditions and product demand have shown that stored materials become valuable assets in future years at which time they are reclaimed, finished, and marketed. The pond designations, construction, and products stored are detailed in Table 5 and shown on Figure 11.

TABLE 5
PRODUCT STORAGE PONDS

Pond	Pond Use and Construction (Liner)	Product
P-2	Mill Containment (concrete)	Intermediate product and tailings storage after liquid decantation during emergency shutdown of Mill.
P-7A	Product Storage (asphalt pad and liner)	Currently holds lanthanum concentrate.
P-7B	Product Storage (asphalt pad and liner)	Bastnasite concentrate for Separations Plant feed.
P-25A	Product Storage (asphalt berm and bottom)	Cerium concentrate – product is dried on demand.
P-25B	Product Storage (membrane lined)	Lanthanum concentrate – receives excess fresh production for long-term storage, blending, & recovery.
P-28	Product Storage (membrane lined)	Lanthanum concentrate – receives excess fresh production for long-term storage, blending, & recovery.

Source: Molycorp, 2003

Concrete Batch Plant

The concrete batch plant is located just east of the Utility Shop (refer to Figure 11). The plant produces concrete for various onsite construction and maintenance activities. The batch plant consists of a 20-foot high by 10-foot diameter storage tank with a pneumatic fill system and a permitted baghouse on the silo for emission control.

1.2.2 Hazardous and Toxic Materials

Molycorp uses a variety of reagents to produce its various lanthanide products. Some reagents such as hydrochloric acid and nitric acid are key to the manufacturing operations. Other reagents may be interchanged from time to time with comparable substitutes. Examples of reagents used by Molycorp for which substitutes may be used include the following:

- Product reactants such as acetic acid (glacial), ammonium bicarbonate, ammonium bi-fluoride, ammonium hydroxide, ammonia, and oxalic acid.

- Neutralizing agents such as ammonium hydroxide, ammonia, sodium hydroxide, and urea.

- Beneficiation aides such as barium chloride, calcium hydroxide, hydrogen peroxide, hydroxylamine hydrochloride, nitrogen, Nalco defoamers, sodium carbonate, sodium hydrosulfide, sodium hydroxide and sodium sulfide, sulfuric acid, and zinc pellets.

- Extraction aids such as kerosene, phosphoric acid esters, and Ionquest 801.

- Flotation aids such as Econofloat, orazan, Pamak, Pamolyn fatty acid, Rhodopan EC, sodium silicofluoride, Superfloc flocculent, ultrazine, and Wesslig products.

- Flocculents such as Nalco flocculents.

Molycorp has prepared and implemented a number of plans associated with management of hazardous materials in accordance with established local, state, and federal regulations including a Hazardous Materials Business Plan (HMBP) and a Risk Management Prevention Plan (RMPP).

All of the hazardous materials that are handled and stored on-site are listed in the HMBP. In addition, the HMBP shows the locations where materials are stored, received, shipped and handled as well as the typical quantities and frequency of use. The HMBP is updated bi-annually, the last time in 2001. The RMPP describes the programs, procedures, practices, and provisions implemented by Molycorp to reduce the likelihood and/or severity of an acutely hazardous materials (AHM) release or accident at the site. The AHMs currently handled at the site include nitric acid, sulfuric acid, sodium arsenite, and chlorine. Currently, anhydrous ammonia is not used at the facility but continues to be included in the RMPP to allow for future use.

In the event of a hazardous material release, appropriate measures to control, contain, and report the release would be initiated according to Molycorp's Emergency Response Plan and/or Spill Reporting Policy. Containment scenarios include combinations of spill containment launders, absorbents, and adequately sized lined and/or bermed containment areas and trenches to contain the tank contents plus surge capacity. Some containment areas are equipped with sump pumps that may be used for clean-up. Emergency response materials stored at the facility include soda ash, oil booms, and various adsorbent materials.

In 1999, Molycorp's annual Toxic Release Inventory (TRI) reported the following toxic chemicals used and released at the site:

- Lead compounds
- 1,2,4-Trimethylbenzene
- N-Hexane

1.3 MINE WASTE

Mine waste materials are categorized as mining overburden, mill/flotation plant tailings, mineral recovery wastewater, domestic wastewater, and industrial wastes including refuse, chemicals, oil and grease, and miscellaneous materials such as reagent drums, tires, and scrap metals. Wastewater is discussed under Section 1.4.

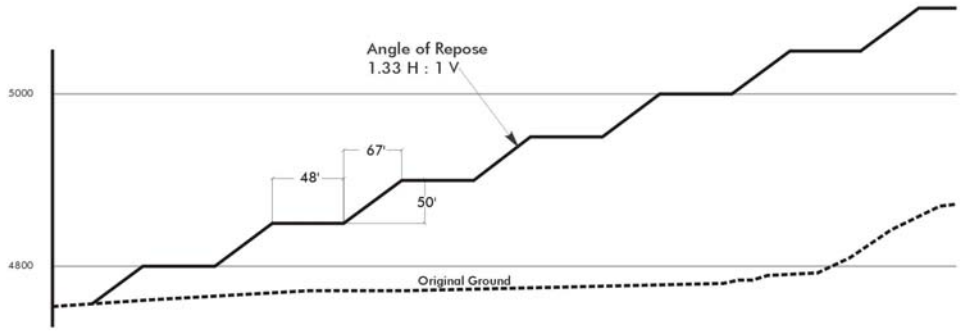
1.3.1 Overburden

Based on current drilling information, the bastnasite ore body dips about 40^{o} west from the surface to a depth of over 1,200 feet. As excavations push west and increase in depth to follow the ore body in Phase 1, the amount of overburden will increase accordingly (see Table 2 and Sheet 3). The current stripping ratio of overburden to ore is estimated at 4 to 1. This ratio increases to 8.6 to 1 during the first five years of operation and remains above 7 to 1 through Phase 1. As excavations turn south in Phase 2, overburden ratios decrease to near 3 to 1 by year 22. The total estimated amount of overburden during Phase 1 is 63.7 million tons and during Phase 2 is approximately 35 million tons.

The overburden mined from the pit will be placed on the existing West Overburden Stockpile during years 1 through 13, based on the estimated overburden production shown in Table 2. The West Overburden Stockpile will expand in lifts of area and height until its maximum size is reached (refer to Figure 5). The current 70-acre West Overburden Stockpile Area will be increased by approximately 90 acres to the south and then to the west during Phase 1. In order to initiate reclamation on the lower slopes in the near term, the first lift of the stockpile will be constructed to the full perimeter of the planned footprint. Note that approximately 9 million tons of overburden will be utilized for the East Tailings embankment.

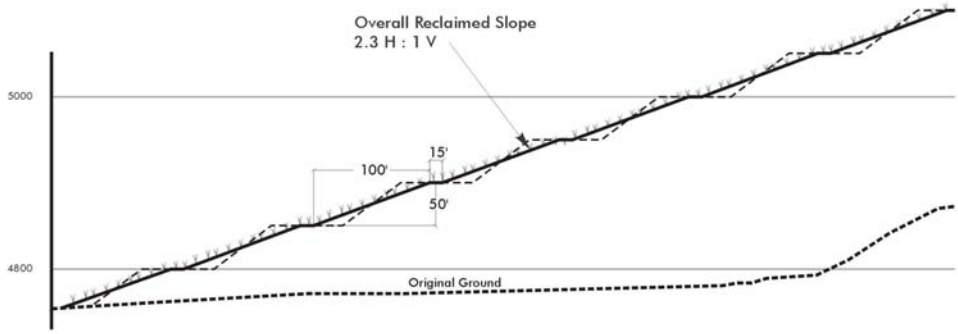
The West Overburden Stockpile would be filled with about 51 million tons of overburden through approximately year 13 under planned operating conditions. The west, south, and east stockpile faces will be constructed in 50-foot vertical lifts. Overburden is dumped at its angle of repose (37º or 1.33H:1V) with a slope width of approximately 67 feet and a 48-foot wide bench (see Figure 13). The slopes will be reclaimed by dozing the crest or lip of each bench to create an overall 2.3H:1V slope. The faces will be sculptured to recreate natural appearing slopes and to create islands and pockets to capture seeds and rainfall to facilitate revegetation and stability. The crest of the West Overburden Stockpile will be about 5,100 feet above msl or about 300 feet above the surface at its highest point. The crest is currently at approximately 4,950 feet msl.

Overburden will be deposited into the expanded North Overburden Stockpile during years 13 through 30. This existing 18-acre stockpile will increase by approximately 61 acres during Phase 1 and another 66 acres in Phase 2 to a total area of approximately 145 acres. The North Overburden Stockpile will be filled with approximately 39 million tons of overburden with a top lift at 5,130 feet msl or about 175 feet above the surface at its highest point. Overburden is dumped at its angle of repose (37º or 1.33H:1V). The stockpile will be designed in 50-foot lifts with an 48-foot wide bench, reclaimed at overall 2.3H:1V slopes to facilitate revegetation and



Typical Stockpile Slope Detail
Before Reclamation

0 50 100 150 200
FEET



Typical Stockpile Slope Detail
After Reclamation

0 50 100 150 200
FEET

Source: Independent Mining Consultants, 1999.

Stockpile Slope Design and Reclamation

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Mountain Pass Mine
San Bernardino County, California
1-35

Figure 13

stability. The faces will also be sculptured to recreate natural appearing slopes and to create islands and pockets to capture seeds and rainfall to facilitate revegetation and stability.

1.3.2 Mill/Flotation Plant Tailings

Inactive Tailings Storage Areas

During the early years of operations, tailings were deposited into the West Tailings Pond (P-1) located southwest of the mill/flotation plant. Subsequently tailings were also deposited into the smaller South Tailings Pond (P-3) located immediately south of the mill/flotation plant.

Closure of the former tailings pond P-1 is being conducted under WDR 6-00-74 as approved by the RWQCB in 2000. It consists of a final cover composed of two feet of prepared foundation material, a geo-composite layer composed of sodium bentonite clay sandwiched between and bonded to two layers of non-woven geo-textilies, 1.5 feet of select cover material, and 0.5 feet of native soil/growth medium. Two down gradient monitoring wells will be used for ground water monitoring and a Monitoring and Reporting Program is stipulated in the Board Order.

The South Tailings Pond (P-3) was clean-closed in 1987. As part of the site investigation and correction action, P-3 is being re-sampled to characterize any remaining constituents that may be impacting ground water.

North Tailings Storage Area (P-16)

When the mill/flotation plant was operational under normal operating conditions, tailings were deposited in the North Tailings Storage Area (P-16). The North Tailings Storage Area covers approximately 70 acres and the crest of the tailings dam is at the 4,950-foot level. RWQCB Order No. 6-98-19 required Molycorp to discharge tailings into a lined facility by April 2000. Deposition of tailings into P-16 was terminated at that time.

An interim plan for the continued use of a lined portion of P-16 was approved by the County of San Bernardino on September 26, 2000 and by the RWQCB on November 16, 2000 (WDR 6-00-101). Molycorp conducted a limited 5-month mining and milling operation in the year 2001 and a second run completed in November 2002. These interim operations were conducted in a manner to facilitate ultimate closure of P-16. A 30-acre portion in the northern portion of P-16 was lined with a geomembrane liner and tailings placed over the liner. Water was removed using a floating barge and reused in the mill operations and for dust control. Tailings were delivered by pipeline from the mill to a cyclone where they are separated into relatively coarse and fine tailings fractions. The existing capacity of P-16 was more than adequate to contain the approximate half million tons of tailings produced during the two operational periods.

After the tailings dry, they will be moved and spread over the remainder of P-16 in order to achieve the final closure grades and cover. The cover system will be designed and constructed to meet or exceed CCR Title 27 requirements as approved by the RWQCB.

East Tailings Storage Area (Planned – Part of CUP)

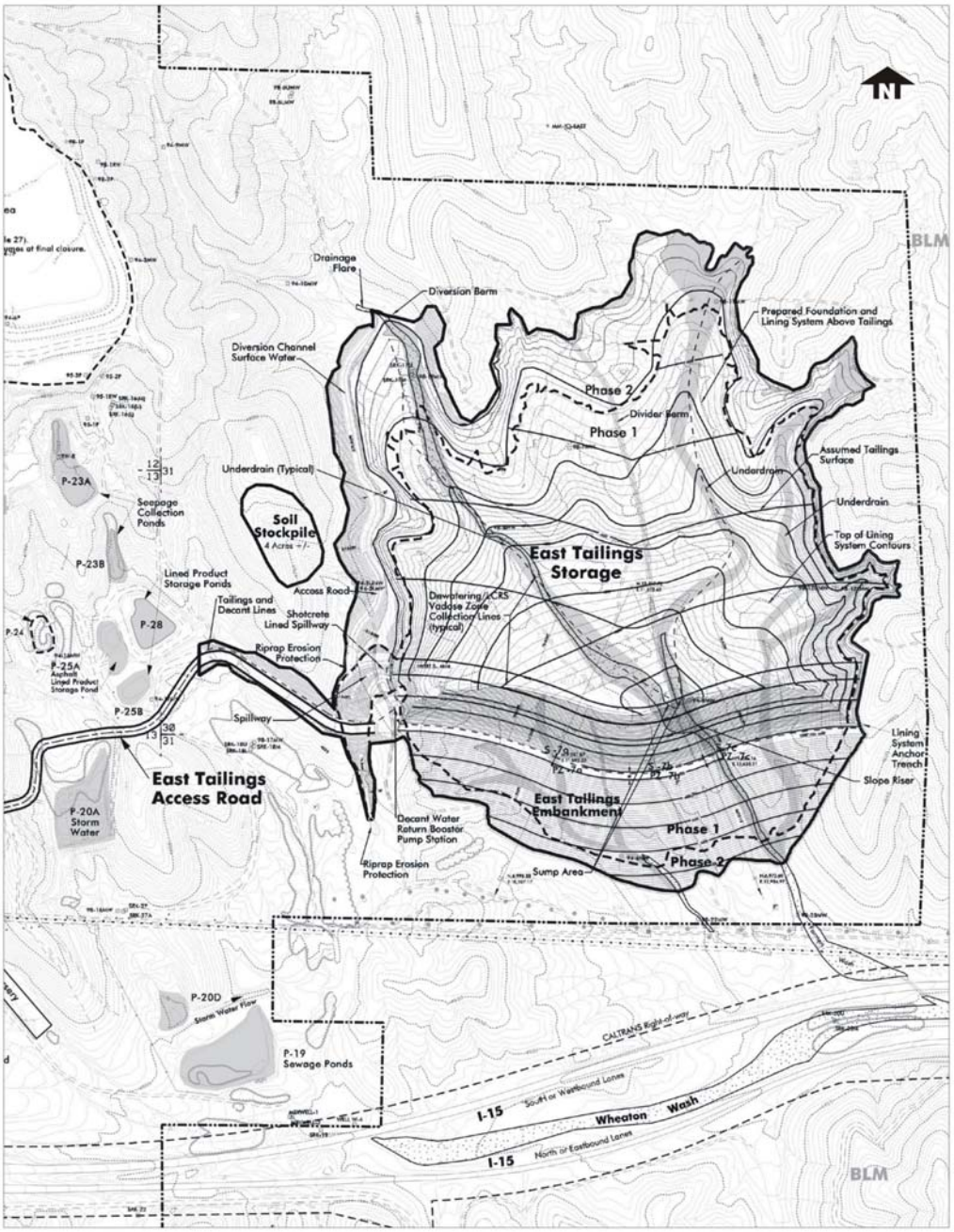
Molycorp completed evaluations of alternative long-term tailings storage options. As a result, a new lined tailings storage facility was identified based on environmental, operational, and cost considerations. The proposed lined East Tailings Storage Area is planned to replace P-16 and is part of the 30-year operational plan.

The East Tailings Storage Area would be located to the southeast of P-16 by constructing a soil and rock embankment downstream. The new tailings storage area would have the capacity to contain approximately 19 million tons of tailings and a design life of approximately 30 years. The impoundment was sized based on tailings production associated with an average mill feed rate of 2,000 tons per day as well as water balance evaluations, and consideration of criteria associated with storm events. The components of this impoundment will consist of the embankment, lining systems, pipelines and pumping systems, an access road, perimeter surface water diversion channels, and spillways for each embankment phase.

The East Tailings Storage Area would ultimately occupy 222 acres (see Figure 14). The area lined for tailings storage would total approximately 174 acres and the impoundment embankment would occupy approximately 48 acres. A 4-acre soil stockpile would be sited to the west of the facility and a 5-acre haul road to the mill site will be constructed. The tailings storage facility would be constructed in seven stages; each stage providing several years of disposal capacity. Note that the actual number of stages, and the operating time between stages, may vary depending on economic conditions and production. The embankment would be constructed using compacted overburden transported from the mine pit and material removed from the tailings storage area footprint. The embankment crest will be maintained at a 50-foot width with the upstream face sloped to 2H:1V with the impoundment lining system extending over the face. The downstream face will be sloped to 2.5H:1V and will be covered with rock or soil with similar color to the natural desert to limit visual impacts. In addition, the embankment has been designed with a curved crest to further reduce visual impacts.

The final crest of the embankment would be approximately 4,650 feet msl, with a maximum height of 240 feet above the surrounding terrain. The storage area will have a liner system (refer to detail on Sheet 6) from the top down constructed of a smooth 60-mil high density polyethylene (HDPE) geomembrane; a geosynthetic clay liner; a geocomposite leachate collection and removal system (LCRS); a second 60-mil HDPE geomembrane; and prepared subgrade soil. The liner system will provide containment that exceeds the requirements of the California Code of Regulations (CCR) Title 27 for Group B tailings impoundments. In addition, the tailings storage area will have a vadose zone monitoring and leak detection system.

Placement of the tailings in the storage area would be performed by hydraulic deposition by use of spigots and/or cyclones. The tailings slurry will contain approximately 35 percent solids by weight and flow at a rate of approximately 670 gallons per minute (gpm). The tailings would be pumped from the mill/flotation plant to the lined storage area via a new 8-inch diameter double-lined pipe system; in a manner similar as currently used in operation of P-16. The pipeline will be located on or adjacent to the new access road. Typically, the outfall spigots are moved to



East Tailings Storage Area

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Mountain Pass Mine
San Bernardino County, California

Figure 14

allow the tailings to dry and consolidate. The water stored in the tailings impoundment will be returned to the mill for reuse and used for dust control on dried portions of the tailings surface. With the exception of evaporation, all water will be captured and reused as described above. As in past operations, tailings may be reused from the East Tailings Storage Area.

Sufficient freeboard will be provided within the impoundment at all times to minimize the risk of spillage. Diversion structures will divert stormwater to Farmers Wash and Wheaton Wash. Surface water diversion structures will be used to convey a portion of the upgradient run-off around the tailings impoundment.

A 60-foot wide access and haul road of approximately 5 acres will be constructed from the mill/flotation plant to the embankment. This road will be used to haul overburden from the pit for embankment construction and for the routing of the tailings and return pipelines. In addition, a 12-foot wide road will be constructed around the perimeter of the impoundment.

Upon reaching capacity, the storage area would be closed in accordance with a RWQCB approved closure plan. A post-closure maintenance and monitoring plan will be implemented throughout the 30-year post-closure period or longer if the waste poses a threat to public health and safety or the environment, as required by Title 27. The post-mining land use is designated as a closed waste management unit.

Additional, detailed information for the new tailings storage area is provided in the report entitled "Report of Waste Discharge for the East Tailings Facility" which was submitted to RWQCB in December 1998.

1.3.3 Landfills

There are two small, inactive landfills onsite designated as the Community Landfill and the Company Landfill (refer to Figure 3). Closure and post-closure maintenance of the landfills are not part of the planned project. General site refuse (nonhazardous solid waste) is currently disposed of at permitted public landfills.

The Community Landfill footprint encompasses an area of approximately 3.9 acres northwest of the pit with a maximum depth of 20 feet. It was constructed in a natural, unlined depression and operated from the 1960s until December 1987. The landfill received construction debris and municipal waste from an onsite trailer park. Interim soil cover was placed over the deposited waste on a regular basis and approximately 75 percent of the landfill volume is comprised of soil cover materials. In December 1987, Molycorp ceased landfilling activities and covered the landfill with approximately six inches of natural alluvial material.

Operated from the 1960s until December 1991, the Company Landfill is located northwest of the North Tailings Storage Area (P-16) and is constructed in two benches on the side of a surface drainage wash. The landfill's footprint covers four acres to a maximum depth of 50 feet. Generally, the landfill received general office wastes, tires, packaging materials (e.g., boxes and empty containers), construction debris and other miscellaneous materials (e.g., steel, PCV and

HDP plastic piping, empty drums, and plastic trash bags). The Company Landfill is covered with two feet of natural soil fill material and approximately 70 percent of the landfill volume consists of soil and waste rock material.

In March 1994, Molycorp prepared and submitted a Report of Waste Discharge (ROWD) and closure and post-closure maintenance plans for each landfill to the DEHS, the RWQCB, and the California Integrated Waste Management Board (CIWMB). Results of the field investigations, waste characterization, quarterly ground water monitoring, and the geologic, hydrologic and climatic conditions indicated that: 1) the landfills do not pose a threat to water quality and 2) that leachate or gas recovery systems are not warranted. Ground water and a gas monitoring wells will be installed at each landfill to monitor future ground water and gas conditions as requested by the RWQCB.

Final cover material for the landfills will consist of low permeability material consisting of native alluvial soils. A three-layer cover system has been proposed (consistent with other landfill closure plans recently reviewed/approved by the CIWMB). Surface runoff from the landfills will be diverted by perimeter drainage ditches designed to accommodate a 24-hour, 100-year storm event. The ditches will be protected by riprap where appropriate and will be designed to prevent local runoff from eroding the landfills and to safely carry runoff from the landfill surface.

Post-closure maintenance of the landfills will be the responsibility of Molycorp with regulatory oversight provided by RWQCB, San Bernardino County Department of Environmental Health Services (DEHS), and the California Industrial Waste Management Branch (CIWMB). Post-closure maintenance will be for a minimum of 30 years as required by Title 27. After that time, post-closure maintenance could cease provided Molycorp can demonstrate that the landfills do not pose a threat to health, safety, or the environment. Financial assurances for the maintenance of the landfills are required in both state and federal regulations of landfills.

Molycorp utilizes a small area on the West Overburden Stockpile for disposal of inert materials (broken concrete and asphalt). This material will be covered by overburden and the disposal site will move to another location as the stockpile is constructed.

1.3.4 Waste Management

Regulatory Compliance

The Mountain Pass Facility is in compliance with regulations that govern the generation and storage of hazardous waste under the following State and Federal guidelines:

- Annual Hazardous Waste Generator/Handler Fee

  - State of California – Board of Equalization – Environmental Fees Division
  - San Bernardino County – Fire Department (CUPA)
  - HF HQ 36005826 (California Hazardous Waste Generator Identification Number)
  - CAD 009539321 (EPA Hazardous Waste Generator Identification Number)

- Biennial Facility Hazardous Waste Report

  – California Department of Toxic Substances Control – Hazardous Waste Management Program

    EPA regulations state that all large quantity generators of RCRA regulated hazardous waste and/or handlers that treat, store, or dispose of RCRA hazardous waste on site, in units subject to RCRA permitting, are required to file the hazardous waste report. These regulations are contained in Sections 3002 and 3004 of RCRA (Part 40 CFR, Sections 226.41, 264.75, and 265.75).

General Waste Types

A summary of waste streams typically generated at the Mountain Pass Plant is provided in Table 6. These wastes are managed according to applicable local, state, and federal regulations. Hazardous wastes are stored in a designated hazardous waste storage area located on a fenced, bermed concrete pad adjacent to the Specialty Plant. In addition, a non-hazardous waste storage area is located near the southern stockpile. Universal wastes accumulated onsite include lamps, batteries (excluding lead acid batteries), cathode ray tubes (CRTs), and aerosol cans. The majority of the wastes are shipped off-site for recycling and/or disposal at an approved treatment, storage, or disposal facility (TSDF). Other wastes, such as waste oil and zinc, are sent to a permitted facility to recover energy and mineral resources.

TABLE 6
WASTES GENERATED AT THE MOUNTAIN PASS PLANT

Drained Used Oil Filters
Zinc
Absorbents and Oil containing rags, dirt, debris, oil & grease, rubber hoses
Waste Lube Grease
Used Oil
Oil/Gasoline/ Water
Off-Spec Epoxy Coatings
Empty Aerosol Cans/Paint
Off-Spec Thinners and Cleaners
Virgin Obsolete Chemicals
Lab Waste (corrosive liquid)
Soil with Oil, Water, and Antifreeze
Spent Solvents from parts cleaners
Non-RCRA Lab Packs
RCRA Lab Packs

Source: Molycorp, Inc. 2002

Radiological Materials and Wastes

The bastnasite ore contains small amounts of Uranium-238 and Thorium-232. The average thorium concentration in the ore is 0.02 percent by weight [22.0 picocuries per gram (pCi/g)] and the average uranium concentration is 0.002 percent by weight (6.7 pCi/g). The radioactive decay products of both thorium-232 and uranium-238 also exist in the ore body in equilibrium with the parent and are within the natural variability of background concentrations.

The radioactive constituents within the ore are natural and are considered to be Naturally Occurring Radioactive Materials (NORM). After the ore is fed to the mill and flotation circuit, the ore goes through numerous physical and chemical separation operations that also result in the concentration of thorium, uranium and their decay products in various lanthanide products and wastes. Since these concentrations of radionuclides have been modified by mineral recovery operations, certain materials containing radioactive constituents are subject to licensing requirements. Molycorp has performed evaluations and inventories of the concentration of radionuclides in various stages of the mineral recovery process.

Federal regulations governing low-level radioactive materials pursuant to the Atomic Energy Act are contained in 10 CFR Part 40 and have been adopted by reference by the State of California. Based on various provisions of the federal Atomic Energy Act, historically Molycorp has operated its Mountain Pass mineral recovery facilities under exemption from licensing provisions except for sealed sources and the re-introduction of the lead-iron filter cake for which the facility has a license from the State Department of Health Services Radiologic Health Branch. More recently, Radiologic Health Branch advised Molycorp that certain operations are subject to state licensing requirements. While not conceding that the operations are subject to licensing requirements, Molycorp is in the process of applying for a license for the handling and possession of radioactive materials. The application will include a complete description of radioactive materials and a comprehensive radiological health protection and monitoring program. This new license will require additional control measures in these specific operations, but will not include mining and extraction operations, which are deemed not to require licensing.

1.4 PRODUCTION WATER

1.4.1 Freshwater

Freshwater supply systems associated with the Mountain Pass Operations are not located at the Mountain Pass site. Instead, two well fields that are located in Ivanpah and Shadow Valleys, supply the mine with freshwater. Most of the pipelines that transport the freshwater to the site are located on public lands administered by the BLM and the NPS. The pipeline facilities have previous approvals from the BLM and this Plan does not propose modifications. The Ivanpah well field is located on private land eight miles east of the mine site and consists of six freshwater producing wells, three booster pumping stations, and associated pipelines. The Shadow Valley well field, located 12 miles west of the mine site, consists of four wells of which three are on public land and one on private land, a single booster pumping station, and associated pipelines (refer to Figure 2).

The Mountain Pass Facility has a current Domestic Water System Permit issued by San Bernardino County DEHS which is renewed annually (January 1 through December 31). As a supplier of domestic water, Molycorp must comply with the requirements of Title 22 of the California Code of Regulations.

The amount of freshwater consumed by the facility in 1996 was approximately 850 gallons per minute (gpm) or 1,388 acre-feet. The five-year annual average between 1993 and 1997 was 795 gpm or 1,281 acre-feet. As part of the comprehensive plan for continued operations, Molycorp is placing emphasis on onsite management and treatment of wastewater and maximizing the reuse of wastewater. The increase in wastewater reuse and the reduction in water usage required for mineral recovery operations will substantially reduce freshwater consumption onsite. Based on continued normal operations, Molycorp expects to reduce its freshwater consumption by up to 30 percent to approximately 525 gpm or 845 acre-feet per year. Figure 15 is a schematic diagram of the water supply/disposal system and the estimated water flows for the various activities onsite for the 30-year plan.

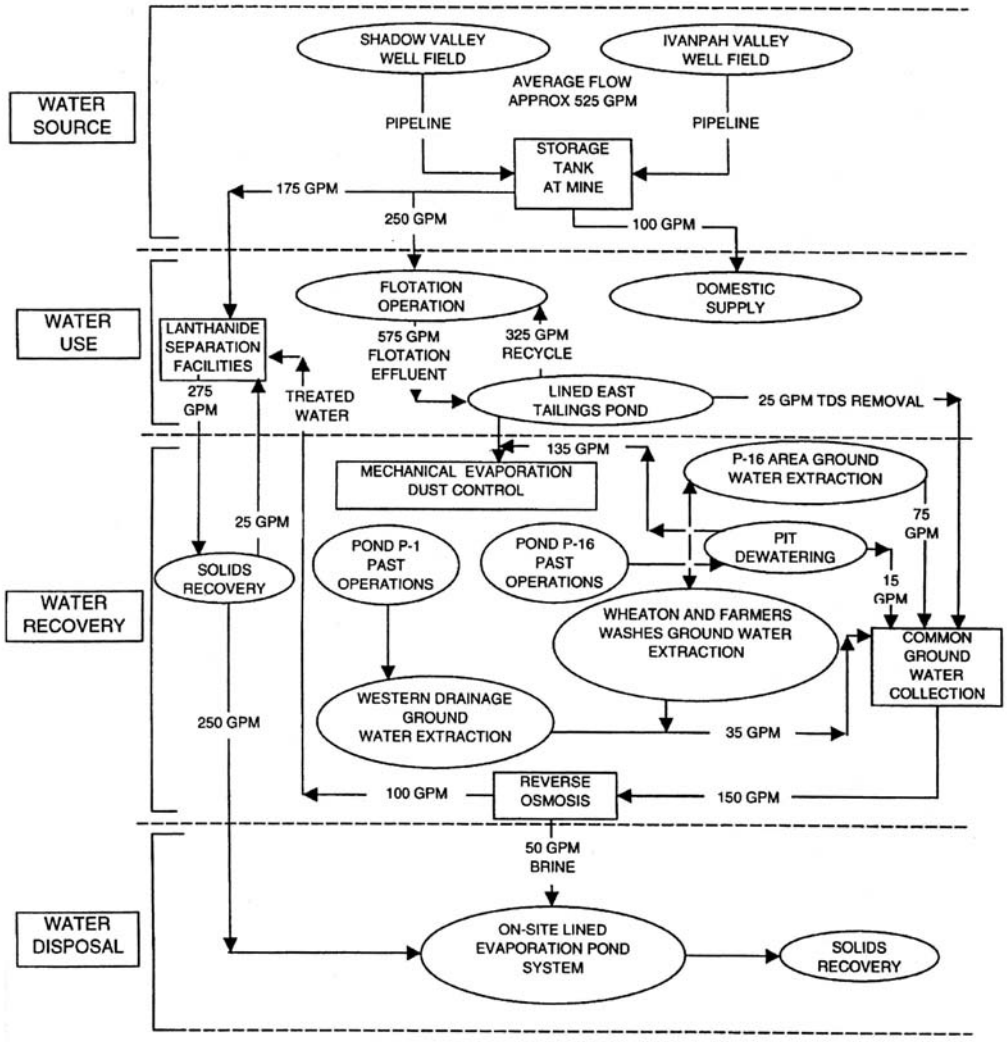
1.4.2 Recycled Water

Water is recycled from the North Tailings Storage Area (P-16) and from pit dewatering wells for use in the mill/flotation plant. The tailings slurry deposited in the North Tailings Storage Area (P-16) separates by gravity, forming a pond overlying the settled tailings. The water is collected by a floating pump and recirculated through the mill/flotation plant. In addition, water from the pit dewatering wells is used for dust control and/or sent through the mill/flotation plant. In 1996, approximately 100 gpm of pit water were pumped from the pit wells for onsite use and for dust control in place of freshwater.

In future operations, water will be recycled from the planned East Tailings Storage Area in the same manner as the North Tailings Storage Area. Tailings pond water and pit well water will be fed through the onsite wastewater management system and then used throughout the mineral recovery operations. Approximately 325 gpm of recycled water are expected to be used in the mill/flotation plant. In addition, pit dewatering provides approximately 150 gpm for mostly dust control and ground water extraction provides approximately 110 gpm (will decrease with time) for the separations facilities (refer to Figure 15).

1.4.3 Wastewater Management

Under normal operating conditions, wastewater and stormwater from secondary containment areas located throughout the mineral recovery plants are collected and transferred to the 204 Thickener Circuit. After pH adjustment, soluble lanthanides and trace amounts of other metals are precipitated from solution as solids. Next, the precipitated solids are settled in a thickener and recovered as a thickened slurry or filter cake. The recovered solids are reintroduced into Separations Plant operations for lanthanide recovery or are marketed for direct sale.



Schematic Diagram of Water Supply/ Disposal System

Prepared By: LILBURN CORPORATION

Mountain Pass Mine
San Bernardino County, California

Figure 15

The clarified liquid effluent from the thickener overflow, previously flowed by gravity through a pipeline to the New Ivanpah Evaporation Pond. With the suspension of the use of the wastewater pipeline, no wastewater is currently flowing through the pipeline and into the New Ivanpah Evaporation Pond. This pond will be closed in accordance with RWQCB regulations. The wastewater pipeline facilities are not part of the ongoing plans for the mine site operations and will be reclaimed under RWQCB, BLM, and NPS requirements.

Onsite Evaporation Ponds

Molycorp is planning to evaporate wastewater generated from mineral recovery operations and ground water remediation systems in lined solar evaporation ponds within the confines of the mining site at Mountain Pass. The planned onsite ponds are part of the CUP and will replace the New Ivanpah Evaporation Pond, which became inactive in March 1998.

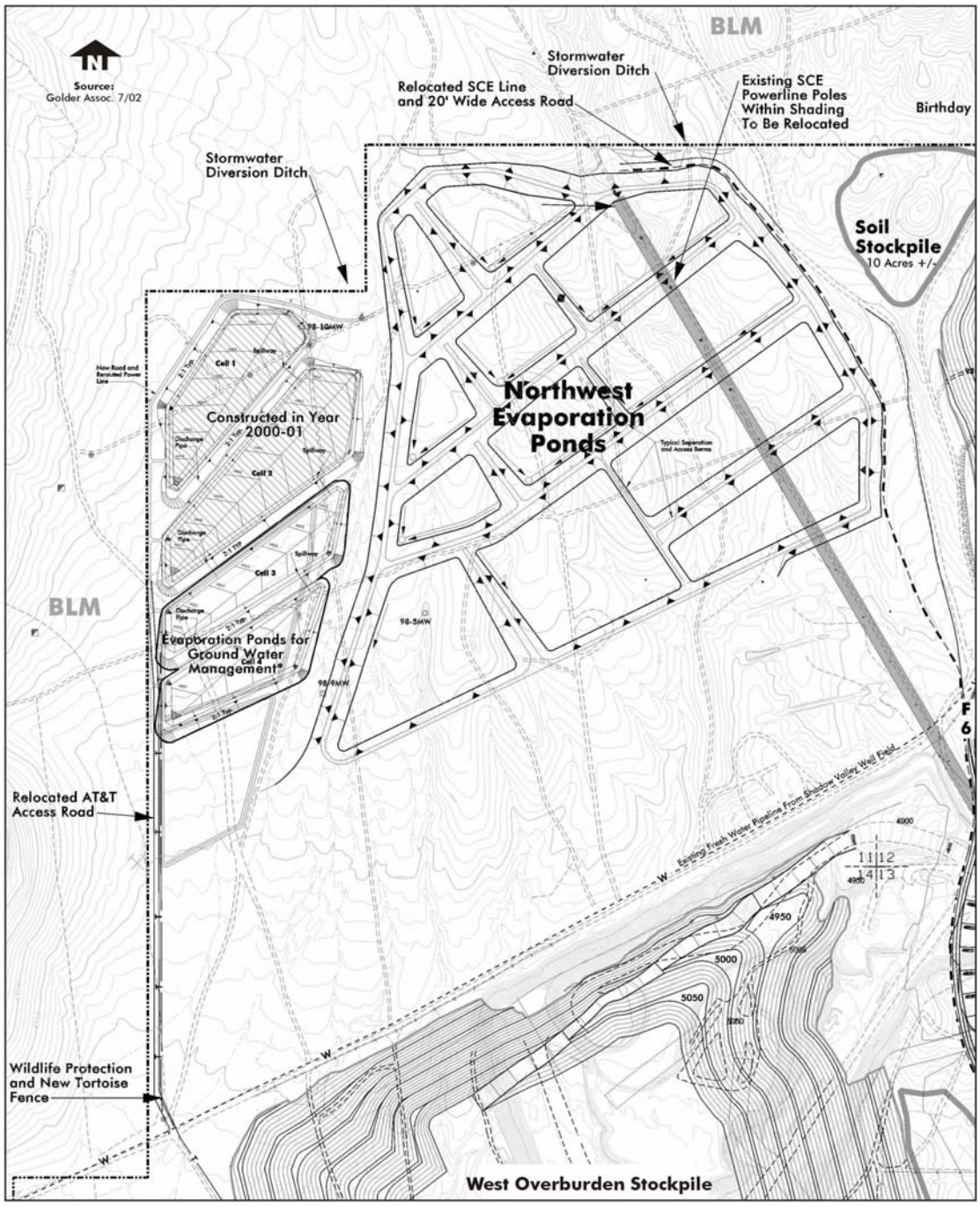
The planned evaporation ponds place emphasis on onsite management and treatment and maximizing the reuse of water. Based on comprehensive evaluations of various alternatives, the project involves a combination of membrane filtration treatment to maximize water reuse, and onsite solar evaporation ponds for the filtration system brine and untreated water streams.

Approved Onsite Evaporation Ponds

Four onsite evaporation ponds were approved by the County of San Bernardino in April 2000 and by the RWQCB in May 2000 (WDR 6-00-34). These ponds will cover approximately 37 acres and two of the four ponds were constructed in 2000 – 2001 in the northwest portion of the project site (see Figure 16). The evaporation pond system includes seepage recovery water collection and storage tanks, pipelines and pumping systems, four interconnected, double-lined evaporation ponds, and a 3-acre storage pond (unlined) for temporary storage of treated water. The system includes 3-million gallons of storage capacity. Of the 37 acres, the lined evaporation ponds' surface would account for approximately 20 acres.

The evaporation ponds accommodate recovered ground water or tailings seepage from the ongoing ground water remediation south of the North Tailings Storage Area (P-16), excess pit water, stormwater runoff, and some tailings reclaim water collected and pumped to an existing wastewater collection tank (referred to as the old ammonia make-up tank). From this tank, the water is pumped through a reverse osmosis final filtration system that produces two water streams. One stream will be relatively high quality water (treated water) suitable for facility re-use, land application, or discharge. The second stream, concentrated brine, will be piped to the evaporation pond system for solar evaporation.

The treated water may be temporally stored in the storage pond or applied to a 40-acre area located south of the evaporation ponds. These two facilities have not been constructed as the treated high-quality water has been reused onsite. The land application area (if utilized) would consist of a piping network and spray systems to achieve uniform distribution. Based on modeling, land application water will not infiltrate to a depth greater than 3 feet. The quality of the treated water is similar to the background water quality in the area, which ranges in depth



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LILBURN
CORPORATION

Northwest Evaporation Ponds

Mountain Pass Mine
San Bernardino County, California

Figure 16

1-46

from 150 to 250 feet below the surface. Under normal operating conditions when the plants are active, the treated water is used throughout the mineral recovery plants and for dust control and there is no need for land application or disposal of this water.

The layout and location of the approved solar evaporation ponds are based on technical and environmental considerations and the long-term plans for mining operations. Pond embankments will be less than 25 feet with each pond sized at approximately 5-acres to provide flexibility in operations and maintenance. The ponds are designed to normally operate with cascading flows from the highest to the lowest pond. By cascading the waters, the accumulation of salts will be confined primarily to the lowest pond, thus making removal of the salts and closure of the ponds more efficient. Total storage capacity is approximately 65 acre-feet or 42 million gallons.

Additional Planned Evaporation Ponds

The approved ponds and systems will eventually be made part of the evaporation pond system for the 30 –Year Plan. Before the plant resumes operation which will require a need for additional wastewater capacity, additional evaporation ponds will be constructed. The planned 133 acres of additional ponds and embankments are defined as the Northwest Evaporation Ponds (NEP) and are part of the CUP. When fully built, the total footprint (the 40-acre ponds and the planned 133 acres of additional ponds) will require approximately 173 acres in the northwest portion of the property as shown in Figures 5 and 16. Note that the 3-acre treated water storage pond (if constructed) would be removed and covered with the planned additional lined evaporation ponds.

The conceptual layout of the ponds has been established to follow the existing topography, to accommodate water balance considerations, and to meet operational considerations. The selected cell configuration is a function of the site topography and incorporation of the existing evaporation ponds. The total area of the additional ponds will be approximately 133 acres with a lined surface area of 78 acres. The overall NEP system would conceptually total 16 ponds with a lined surface area of approximately 100 acres, and a total volume of approximately 400 acre-feet. Note that the number of ponds and the size of each pond or cell are subject to change upon final design, agency review, and operational needs. The layout was developed to:

- Minimize the earthwork required to provide a level cell system on the given terrain;
- Provide operational flexibility; and
- Operate the cells in a cascading cell-to-cell manner.

The conceptual plan brings the evaporation capacity on-stream over a period of time, as each cell is filled and the overflow spills into the next downstream cell. Modeling based on maximum production indicates the following tentative schedule for conceptual pond filling from the commencement of maximum operations. Note that the ponds will be built as needed to handle the wastewater stream.

Year	Surface Area
1	73 acres
2	21 acres
3	6 acres

The cell in the extreme southwest corner down gradient of all other cells will likely accumulate salts and the two cells immediately north and east will serve as backups that will provide capacity when upstream cells are out of service for cleanings or repairs, or if evaporation rates are lower than expected.

The design of the lining system for each evaporation cell is based on the requirements of the CCR Title 27. The lining system consists of a primary 80-mil thick HDPE liner, a geonet drainage layer with a LCRS, a secondary 60-mil thick HDPE liner, and a prepared 6-inch thick bedding layer of material. Each evaporation cell will have a geonet LCRS blanket across the entire area. The contour of the base of each cell is graded with valleys (i.e., two valleys for the larger cells and a single valley for the small cells). Multiple sumps are located below the primary containment, at low points in each cell.

Cells would have an average of 6.1 feet with a storm surge depth of approximately two feet, for a total depth of 8 feet. Salt is expected to precipitate in the extreme southwest dell under normal operating conditions.

In addition, stormwater diversion ditches are designed around the periphery of the pond system and well as along a natural drainage through the center of the pond system. These ditches will divert stormwater around and through the pond/cell layout, and discharge into the existing natural storm water run-off system toward the southwest and the southeast. These ditches are capable of handling a 24-hour probable maximum precipitation of seven inches (SRK, 1985). The final layout and size will be determined in the detailed engineering and construction design and must be approved by the RWQCB. To monitor downstream ground water quality, up gradient and down gradient ground water monitoring wells will be constructed and monitored as required by Title 27.

The cascading operation of the proposed cells limits the salt precipitation to the three downstream cells, resulting in a need to dry out and harvest crystalline salt from the three southwest cells. Adjacent cells are likely to accumulate salt, but this salt will probably resolubilize and cascade to the lower cells. The ability to remove salt precipitate with a dredge from beneath the saturated solution without a separate dry-out/harvesting cycle increases the overall evaporation attained, because it is not necessary to remove salt laden cells from evaporation operation to extract salt from the cell bottom. Salt is extracted without interfering with ongoing evaporation. This salt may be reused as a product or will be disposed of in an appropriate permitted onsite or offsite disposal unit.

Upon site closure, the evaporation ponds will be closed in accordance with applicable regulations in Title 27. Note that some of the ponds may continue to be utilized for ground water remediation activities if needed. The lining systems and ancillary facilities will be removed with material recycled if possible or properly disposed of. The ponds would be graded to reestablish

natural contours and surface drainage, then revegetated. If the salts are stored or encapsulated in the lower cells, a post-closure maintenance plan will be implemented including maintenance of the cap and ground water monitoring. Post-closure maintenance is not required for those cells that are clean-closed.

Onsite Wastewater Ponds (Closed)

Prior to utilization of the Old and New Ivanpah Evaporation ponds, water used during the mineral recovery operations, was formerly discharged to 12 evaporation/percolation ponds located entirely onsite (refer to Figure 11). The old wastewater ponds were built in the 1960s. The 12 evaporation ponds were clean-closed between 1987 and 1991 in compliance with the RWQCB regulations. The ongoing monitoring and remediation for the onsite ponds are not part of the continued Planned Operations discussed in this Plan.

1.4.4 Ground Water Monitoring and Cleanup Program

In the late 1970s, Molycorp began implementation of various measures to mitigate potential ground water impacts associated with the unlined surface impoundments. Such measures included the construction of a wastewater pipeline and evaporation ponds in the Ivanpah Basin to dispose of the wastewater and initiation of pit dewatering. In the mid-to-late 1980s, additional measures included deactivation and closure of many of the surface impoundments and construction of ground water interception systems in the upper and lower portions of Wheaton Wash and in the Western Drainage downgradient of tailings impoundment P-1.

In 1986, Molycorp submitted a ROWD for mining and milling at Mountain Pass, in accordance with the November 1984 revisions to CCR Title 23, Chapter 15. Subsequently, Molycorp has continually submitted reports on waste discharge at intervals stipulated by orders issued by the RWQCB. In 2000, Molycorp was issued new waste discharge orders (6-00-101) for the operation of the North Tailings Pond (P-16) and the new onsite evaporation ponds (P-30A and P-30B) (6-00-34). Also in 2001, discharge order No.6-00-74 was issued for the final closure of P-1 and a new discharge order (6-01-18) was issued for the operation of the clean sanitary effluent lagoon (P-19).

Board Order 6-91-836 required the development of a detailed waste management strategy for the entire mine and mill site and a schedule for implementation of a corrective action program (CAP) for contaminated ground water beneath the mine and mill site. Under CAO No. 6-98-19, Molycorp is required to abate the discharge of wastewater from P-16 to ground water. The CAP includes an extensive monitoring and sampling program designed to monitor and remediate contaminated ground water beneath the site and to determine background levels of ground water quality and develop criteria for determining cleanup levels of contaminated ground water. The ground water monitoring system consists of 66 monitoring wells, 9 seepage extraction wells, and 25 piezometers and is shown on Figure 17 (GSi/*water,* 2001). The number of these facilities changes with time as additional wells are drilled.

In the early 1990s, interception of shallow seepage and groundwater downstream of the North Tailings Storage Area (P-16) was initiated through construction of a series of trenches and collection systems on ponds P-23A and P-23B. These were intended to control surface discharge from the site, and acted as small evaporation ponds and settling basins. The majority of this water was recirculated to P-16.

From the mid-1990s to the present, Wells 95-1RW and 98-1RW have extracted groundwater down gradient of P-16 with recovered water returned to P-16 for eventual use to the mineral recovery operations (refer to Figure 17). In 2000, two new wells (2000-4RW and 2000-5RW) were installed at the south end of P-16 to accelerate the drain down of the mound under the pond. This recovered water is returned to P-16 for eventual use in the mineral recovery operations or evaporated. Other wells have been installed in the open mine pit and in the Western Drainage (ground water extraction wells 2001-RW1 and RW2). Extraction wells Mex-1A, 2A and 3A and a subsurface concrete cut-off wall are located at the entrance to Wheaton Wash (eastern drainage system) at the site known as Mexican Well. Finally, a subsurface infiltration trench and a ground water extraction well have been installed in Farmer's Wash to the east. Finally, a subsurface infiltration trench and a ground water extraction well have been installed in lower Wheaton Wash to the east just below the confluence of Farmer's Wash. The recovered water from these systems had until March 1998 been discharged to the New Ivanpah Evaporation Pond. Currently, the recovered water from these systems is discharged to the new onsite evaporation ponds (P-30A and P-30B).

Molycorp's work with the LRWQCB on cleanup and abatement is ongoing and will continue outside of the planned project.

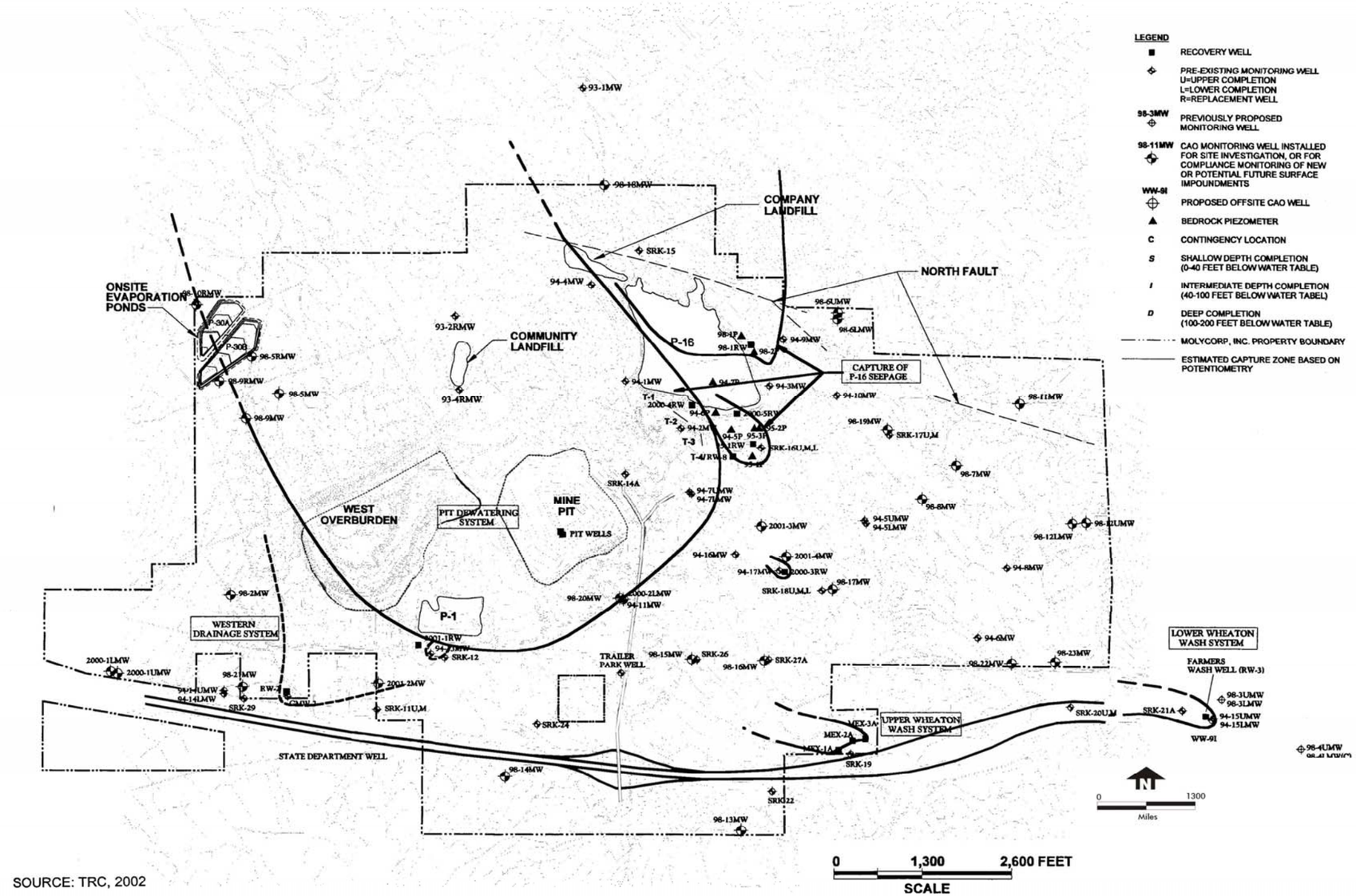
1.5 AIR QUALITY/DUST AND EROSION CONTROL

1.5.1 Air Quality/Dust

The project site is within the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). Mining and mineral recovery operations have the potential to produce substantial air emissions. Molycorp complies with all applicable air quality regulations and maintains numerous operating and pollution control equipment permits for the mine crushing plant, mill/flotation plant, Separations Plant, Specialty Plant, Cerium 96 Plant, and other ancillary facilities. Diesel fuels used onsite for boilers and mobile equipment must also comply with current sulfur content requirements.

The primary air pollutant to be generated as a result of the ongoing operations will be particulate matter or dust from continuing mining, hauling, crushing, overburden storage, and tailings storage. Standard dust prevention measures are currently implemented onsite to reduce dust emissions in the open pit, on haul roads, and from the stockpiles and tailings storage. These include:

- Utilization of water and approved dust palliatives on unpaved haul and access roads to achieve 80 to 90 percent control (on average spraying roads up to two times per day);



SOURCE: TRC, 2002

Groundwater Monitoring and Recovery Systems

Mountain Pass Mine
San Bernardino County, California

Figure 17

Prepared By:
LILBURN CORPORATION

- Restriction of haul truck speeds to an average of 20 mph;
- Graveling and/or paving of heavily traveled roads;
- Watering of tailings storage area and ore stockpiles periodically as needed;
- Stabilizing the overburden stockpiles through revegetation and watering to form a crust on inactive areas; and
- Restricting excavation and hauling activities when sustained winds exceed 30 mph.

Water sprays and water retaining surface treatment chemicals are used to control fugitive dust from the mine roads, plant roads and work areas, and tailings storage areas. A 4,000-gallon truck and a 12,000-gallon water truck are available to wet areas emitting dust due to vehicle traffic or high winds. The mine haul and facility access roads are wetted several times during each operational shift and continuously if dusty conditions prevail.

Tailings are deposited into the tailings storage area in a slurry mixture by a portable pipe that is moved within the storage area. This method keeps most of the tailings storage covered with a moist layer of material/slurry and reduces blowing dust. Dust produced in dry areas of the tailings pond is controlled by a sprinkler system and periodic spraying with recycled water containing sodium lignonsulphonate. The treated areas may also be wetted with the water trucks when dusty conditions prevail.

Upon termination of tailings deposition into the North Tailings Storage Area (P-16) and subsequent closure, a closure cover per Title 27 will be placed over the dried, settled tailings to eliminate future dust problems (see Section 2.5.1). Seeding and natural revegetation will then be undertaken to initiate typical desert vegetation.

Dust problems are expected to be minimal from the pit due to its depth, rock material, and wetting of roads. The inactive portions of the overburden stockpiles are also not expected to be a major source of wind-blown dust due to the rock makeup of the overburden, the wetting of completed areas to form a crusted surface, and revegetation.

The crushing and screening plant is equipped with baghouses, fire deck water guns, and conveyor water sprays to control fugitive dust. The crusher operator wets the crushed ore stockpile and work areas two to three times per shift.

Baghouses are installed on product dryers, roasters, packaging machines, storage bins and numerous other locations where fugitive dust emissions might occur after the ore is milled and dried. Dry baghouses are air emission control devices which capture particulate emissions and prevent escape to the atmosphere. When baghouse bags need to be disposed, they are cleaned and placed in plastic bags and disposed of appropriately. The product removed from the bags is returned to the product stream.

The mineral recovery plants are regulated by air quality permits which require numerous baghouses for dust emissions and scrubbers for regulated chemical releases as required by the MDAQMD.

1.5.2 Erosion Control

The Mountain Pass Mine is located at the southern end of the Clark Mountain Range with on-site elevations ranging from 4,500 to 5,125 feet above msl. The climate is arid to semi-arid with precipitation typically ranging from 4 to 12 inches per year. The mountain ranges flanking the mine site form two distinct watersheds that discharge surface and groundwater east and west of the mine site. Due to climatic conditions, surface runoff is ephemeral and generally occurs as a response to intense summer thunderstorms or snow melt runoff. Rainfall falling north of the mine site, on the south flank of the Clark Mountains, drains into natural arroyos flowing westward into Shadow Valley and eastward into the Ivanpah Valley. The easterly watershed drains to Wheaton Wash and the westerly watershed drains to Shadow Valley.

Stormwater Management

The mine site is graded to drain sheet flow and normal runoff away from the plant facilities and buildings. Stormwater contained in plant sumps and containment areas is transferred to the 204 Thickener Circuit. Surface runoff originating from areas outside the mineral recovery facilities is directed by open drainages along roads to natural drainage channels then to Jack Myers Pond (P-20A) and to the mill stormwater pond (P-29). Culverts and reinforced road crossing are used to route flow along and across haul roads and plant access roads. Runoff originating upstream of the North Tailings Storage Area (P-16) is impounded behind the dam.

The planned East Tailings Storage Area is designed to divert the upgradient runoff from the northwest around the impoundment. Runoff from the east and north will be allowed to flow into the impoundment due to the small size of the watershed and the difficulty of diverting all drainages in these areas (refer to Figure 14 and Sheet 3). Sufficient free board will be maintained in the impoundment at all times to accommodate run-on.

The Northwest Evaporation Ponds are designed so that the major portion of upgradient runoff is directed into an existing channel southward through the pond area. A portion of the upstream runoff will also be diverted to flow both west around the perimeter of the ponds back to its natural drainage west and east (refer to Figure 16 and Sheet 3).

Stormwater Pollution Prevention Program

The State Water Resources Control Board has established a General Stormwater Permit which authorizes the discharge of stormwater from industrial facilities that have obtained an industrial stormwater permit. Molycorp is covered under the California general stormwater permit and operates under an approved Stormwater Pollution Prevention Program (SWPPP). The purpose of an SWPPP is to identify and evaluate sources of pollutants associated with industrial activities

that may affect the quality of stormwater discharges and authorized non-stormwater discharges from the facility.

Operational areas of the facility are potential sources of pollutants to stormwater. Best Management Practices (BMP) are implemented to prevent or minimize contact with stormwater runoff. The facilities are designed such that stormwater run-on and direct rainfall are routed to either the lanthanum recovery circuit or to stormwater containment structures. There are a number of containment structures, pollution controls and other safeguards at the facility that minimize the potential for pollutants to enter stormwater and include the following:

- Stormwater Catchment Basins - There are two stormwater catchment basins located at the Mountain Pass facility. Jack Meyers Pond (P-20A) is an unlined, 3.2 acre pond used to control stormwater runoff from the site. It is located to the southeast of the facility. This structure captures stormwater runoff from the mineral recovery plant area via stormwater diversion structures. The mill/flotation plant containment structure is a surface impoundment lined with HDPE. This impoundment and associated stormwater diversion structures has been engineered to capture stormwater run-off from a 27-acre drainage area consisting of the mill/flotation plant, mobile maintenance and warehouse area. The retention basin has the capacity to retain a volume equal to the run-off of a 10-year, 24-hour storm event, plus the volume of the largest above ground tank when filled to capacity.

- Good Housekeeping – Many of the plant packaging and transfer activities occur outside. To minimize the potential for stormwater contact, accidental spills are cleaned up immediately and material in ripped containers is replaced as soon as possible.

- Enclosed operation areas – Many of the operational activities such as solvent extraction, mobile equipment maintenance, product storage, and product packaging are conducted inside buildings, which minimizes the potential to introduce contaminants into stormwater runoff.

- Impervious surfaces – Most of the processing and product storage areas on site are covered with concrete.

- BMPs for air emissions control – Such measures aid in the reduction of potential pollutants coming into contact with stormwater run-off. These include preventative maintenance on all air pollution control equipment, routine visual emissions readings on stacks during facilities operations, suppression of fugitive dust, and use of air pollution control devices such as baghouses, bin vents, and wet scrubbers located where there is the potential for toxic or particulate emissions from a stack.

Molycorp is required to develop and implement a monitoring program for each facility covered by the General Permit. The purpose of the monitoring program is to ensure that stormwater discharges are in compliance with the General Permit; and evaluate BMPs that have been implemented and their effectiveness to prevent or reduce pollutants in stormwater discharges and

authorized non-stormwater discharges. Monitoring includes visual observations as well as sampling and analysis of stormwater discharges; and an annual report of findings submitted to the RWQCB.

1.6 BLASTING

Molycorp maintains blasting permits from the Bureau of Alcohol, Tobacco and Firearms, the San Bernardino County Sheriffs Department, and CAL-OSHA. The County permit is renewed annually and the Federal and OSHA permits are renewed every five years. Molycorp contracts blast hole explosive loading services from approved vendors. The design and detonation of the blast are the responsibility of Molycorp, Inc. Blasting caps and boosters are stored onsite in portable magazines northwest of the pit away from plant facilities. The two portable explosives magazines are located on the surface of the North Overburden Stockpile away from other site operations at mine coordinates 4,400 East and 11,600 North (refer to Plan sheets or Figure 5). They are provided by the explosive supplier(s) and will be relocated as the pit is developed. The explosives magazines are inspected by MSHA and meet the standards for storage of explosives.

2.0 RECLAMATION PLAN

The intent of the California Surface Mining and Reclamation Act (SMARA) is to "maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that: (a) adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative uses; (b) the production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment; and (c) residual hazards to the public health and safety are eliminated" (Section 2712).

Article 9, Section 3700 of SMARA states the following: "Reclamation of mined lands shall be implemented in conformance with standards in this Article (Reclamation Standards). The standards shall apply to each surface mining operation to the extent that:

(1) they are consistent with required mitigation identified in conformance with CEQA; and

(2) they are consistent with the planned or actual subsequent use or uses of the mining site."

Molycorp will reclaim disturbances wherever conditions and current technology permit and as required by SMARA as administered by the County of San Bernardino. As stated in SMARA Section 3712, the RWQCB permits the operation, closure, and post-closure of the surface impoundments per CCR Title 27. The objectives of this Reclamation Plan are to:

- Eliminate or reduce environmental impacts from mining and mineral recovery operations;

- Reclaim in a usable condition for post-mining end uses which may include:

  - Habitat for native desert wildlife and plants
  - Future mining of the unique mineral resource onsite
  - Recovery of lanthanides from tailings and low grade ore
  - Use of overburden for construction aggregate
  - Continued use as a transportation and utility corridor
  - Geological research and field studies
  - Rangeland for domestic livestock;

- Contour mining features and revegetate disturbed areas to minimize aesthetic impacts; and

- Reclaim and remediate the site as necessary to eliminate hazards to public health and safety and to ground water quality.

2.1 LAND USE

The Mountain Pass Mine is within the historic Clark Mining District established in 1865. Mining and the recovery of various minerals have been undertaken in this area since that time. For the

past 50 years, Molycorp and its predecessors have mined the lanthanide orebody and recovered bastnasite, the mineral of interest, which contains 14 individual lanthanide elements.

The County of San Bernardino General Plan designates the Official Land Use District of the project site as Resource Conservation. This designation provides for open space and recreational activities, single-family homes on very large parcels, and similar and compatible uses. The site is located within Improvement Overlay District 5, which is applied to very rural areas with little or no development potential. The County Development Code permits mining in any land use district within the County subject to a conditional use permit.

The lands surrounding the Mountain Pass Mine site are mostly public lands managed by the BLM. The Mojave National Preserve, managed by the National Park Service, lies 2 to 3 miles to the north, west, and south of the site. The Clark Mountain Wilderness Area is located 4 miles northwest of the project site.

The land uses of immediately adjacent properties include:

North - Open space, BLM managed public lands with mining prospects and claims.

East - Open space, BLM managed public land with mining claims.

South - Interstate 15 through southern portion of mine site. Ten-acre school parcel located in southern portion of mine surrounded by mine property, Caltrans maintenance station, Caltrans and California Highway Patrol (CHP) housing, and numerous utility easements. South of I-15, BLM managed public lands with mining claims and isolated private properties with residences.

West - Open space, BLM managed public lands. Several communications sites with access roads are situated to the northwest.

2.2 VISIBILITY

The project site lies directly to the north of I-15 in view of passing motorists. The principal views are of overburden stockpiles, a series of industrial type buildings extending north up the slope, and infrastructure such as roads and power lines. Buildings and facilities are painted tan to blend into the landscape. Most mining and mineral recovery activities are out of sight of the I-15 motorist. The West Overburden Stockpile is currently visible from I-15 and will become more prominent as its size increases.

The public's viewshed of the mine site is relatively narrow because of its location in a pass between enclosing desert mountain ranges. The mine site is visually enclosed to the north by the Clark Mountain Range; to the west by the crest of Mountain Pass and by the ridges associated with Mohawk Hill; to the south by the Mescal Range; and to the east, by ridges associated with the Ivanpah Mountains and the Clark Range. As a result of this small viewshed, the Mountain Pass Mine site is visible to the public from only an approximate 1.5-mile section of I-15. The freeway is the sole area viewpoint with a substantial numbers of viewers.

The Reclamation Plan elements, which will reduce potential visual impacts, are summarized below and are discussed in more detail in Section 2.5 – Reclamation and Section 2.6 – Revegetation.

The most potentially visible components will be the expanded West Overburden Stockpile in area and height, the expanded North Overburden Stockpile, and the planned East Tailings Storage Area embankment. Measures to reduce visual impacts include the following:

Overburden Stockpiles

- Grade the slope faces to overall 2.3H:1V from active slopes of 1.33H:1V upon completion of each lift as depicted in Figure 13.

- Grade the slope faces to include substantial surface undulations, sculpturing, islands, and terracing to provide areas for natural water and seed collection which will enhance revegetation.

- Cover slopes with a mixture of crushed overburden and stored surface material with coloring to blend into the surrounding natural terrain.

- Revegetate slopes with native plants and seeds.

East Tailings Embankment

- Construct downstream slope facing I-15 at 2.5H:1V.

- Cover embankment face with rock or soil with similar color to the natural surrounding desert hillsides.

- Design embankment with a curved crest to further reduce linear visual impacts.

Miscellaneous

- Paint buildings an unobtrusive color such as tan to blend into surrounding background.

- Continue revegetating the freeway frontage areas east and west of the guardhouse with onsite native vegetation removed from areas to be disturbed.

- Berm and landscape specific sites, lines, and/or areas within the facility to breakup overview of the site and to reduce views of the facility from I-15.

- Revegetate closed pond embankments and surfaces.

2.3 VEGETATION

Surveys of the biological resources have been conducted onsite since July 1990 with additional areas and follow-up spring season surveys continued intermittently since that time. These

biological survey reports are referenced in Section 6 and a plant species list is included in the Revegetation Plan (see Appendix E). Figure 18 shows a generalized mapping of the onsite plant communities, which include Joshua tree-blackbrush, Juniper-blackbrush, and isolated Desert Wash along some of the drainages and man-made ponds. The EIR provides detailed biological information and assessment.

The western and central portions of the site not presently disturbed by ongoing operations and facilities are covered with a Joshua tree-blackbrush community characterized by a variety of scattered species including the following: Mojave yucca (*Yucca schidigera*), banana yucca (*Y. baccata*), and Joshua tree (*Y. brevifolia*); larger shrubs such as paper-bag bush (*Salazaria mexicana*); thornbushes such as Anderson thornbush (*Lycium andersonii*) and peach-thorn (*L. cooperi*); the lower shrubs, blackbrush (*Coleogyne ramosissma*), winterfat (*Eurota lanata*), Nevada joint fir (*Ephedra nevadensis*), California buckwheat (*Eriogonum fasciculatum*), hop-sage (*Grayia spinosa*), thamnosma (*Thamnosmia montana*), and spiny twinberry (*Menodora spinescens*); cacti, beavertail (*Opuntia basilaris*) and deer-horn cholla (*O. acanthocarpa*) and the grasses, big galleta grass (*Hilaria rigida*) and desert stipa (*Stipa speciosa*).

A Juniper-blackbrush community occurs in the eastern portion of the site in the vicinity of the planned East Tailings Storage Area. This community is associated with the metamorphic rock areas comprised of approximately 80 percent rock outcrop and 20 percent Gachado soils, which consists of shallow weathered granite rock. The Utah juniper *(Juniperus osteosperma)* is the only tree present with the sparse shrub species being similar to the Joshua tree-blackbrush community and located mainly on the Gachado soils and soil islands within the rock outcrops.

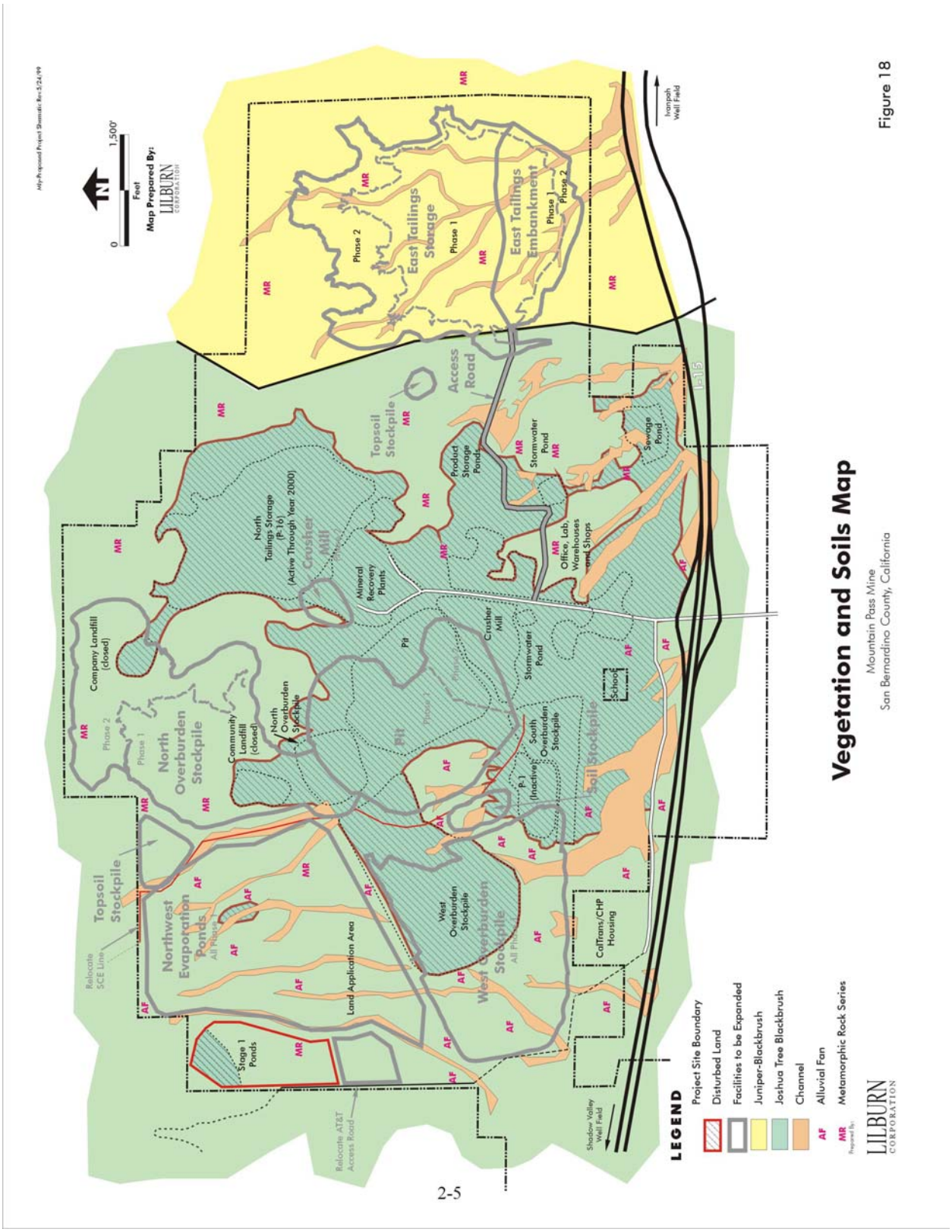
Mojave Desert Wash scrub elements are found where the site has sub-surface water along the more prominent drainage channels and particularly adjacent to onsite man-made ponds. Species include desert willow (*Chilopsis linearis*) and cat's claw acacia (*Acacia greggii*). These are being overrun by Tamarisk scrub and solid stands of Tamarisk (*Tamarix sp.*), an invasive non-native species to be removed as part of the reclamation effort.

2.4 WILDLIFE

Wildlife species that occur onsite are typical of those that inhabit the above mentioned plant communities. Due to the site's elevation and location between numerous higher ridges, the varied surrounding habitats produce a greater diversity of animal species. Surveys of the biological resources have been conducted onsite since July 1990 with additional areas and follow-up spring surveys continued since that time. These biological survey reports are referenced in Section 6 and a wildlife species list is included in the Revegetation Plan (see Appendix E). The EIR provides detailed biological information and assessment.

2.5 RECLAMATION

Reclamation procedures will be incorporated where possible with mining operations in order to maintain economic efficiency and to provide interim reclamation. Reclamation will be ongoing within the two-15 year operational phases with final reclamation occurring for a planned 10-year period after termination of mining activities. Exact time frames for the completion of reclamation


Vegetation and Soils Map
Mountain Pass Mine
San Bernardino County, California
Figure 18
Map Prepared By:
LILBURN CORPORATION
0
1,500'
Feet
N
LEGEND
Project Site Boundary
Disturbed Land
Facilities to be Expanded
Juniper-Blackbrush
Joshua Tree Blackbrush
Channel
Alluvial Fan
Metamorphic Rock Series
East Tailings Storage
Phase 1
Phase 2
East Tailings Embankment
Phase 1
Phase 2
Access Road
Topsoil Stockpile
Product Storage Ponds
Stormwater Pond
Sewage Pond
Office, Lab, Warehouses and Shops
North Tailings Storage (P-16) (Active Through Year 2000)
Crusher Mill
Mineral Recovery Plants
Company Landfill (closed)
North Overburden Stockpile
Community Landfill (closed)
North Overburden Stockpile
Pit
Crusher Mill
Stormwater Pond
School
South Overburden Stockpile
P-1 (Inactive)
Soil Stockpile
Topsoil Stockpile
Northwest Evaporation Ponds
All Phases
Relocate SCE Line
Land Application Area
West Overburden Stockpile
West Overburden Stockpile
CalTrans/CHP Housing
Stage 1 Ponds
Relocate AT&T Access Road
Shadow Valley Well Field
Ivanpah Well Field
I-15

will vary depending on market demand. Plant and soil salvaging, and seed collection will be scheduled to occur prior to phased expansion so as to reduce storage time and double handling of seeds, plants, and soil. In addition, the mineral resource may not be exhausted within the 30-year timeframe, thereby requiring a revision or amendment to this Plan prior to its expiration.

In general, reclamation of the open pit, overburden stockpiles, plant facilities, ponds, and roads will consist of the following activities, which will occur concurrent with ongoing operations. The reclamation and closure of the tailings storage areas and onsite ponds are summarized below and discussed in more detail in Section 2.10.

1. Prior to expansion into an undisturbed area, salvage selected plants from areas to be disturbed for use in ongoing transplanting and to store for future revegetation;

2. Collect seeds of specified plant species prior to new surface disturbance;

3. Stockpile available surface material or growth media for use as a seed bank and for seed bed in separate identified stockpiles seeded with an erosion control ground cover or covered with a larger rock material to limit wind erosion;

4. Establish an onsite nursery or contract an outside nursery that will store and propagate native species that can be used for revegetation. (An onsite plant holding area has been established to the east of the site entrance);

5. Mine the pit to produce stable slopes as recommended by the slope stability study;

6. Contour the slopes and benches of the overburden stockpiles per lift to overall 2.3H:1V to conform with surrounding topography for visual mitigation and revegetation;

7. Decommission, remove, and remediate any hazards for onsite buildings and equipment as determined by the future use of the plant site at the time of closure;

8. Scarify compacted areas and closed roads and cover areas to be reclaimed with available stockpiled surface material;

9. Revegetate areas concurrent with ongoing mining with plant species and seeds native to the site at densities to achieve success as indicated by biological surveys;

10. Close and reclaim tailings storage areas, and other remaining ponds as required and in compliance with closure and post-closure maintenance plans approved and monitored by the RWQCB per Title 27; and

11. Monitor results of ongoing reclamation/revegetation and make revisions to reclamation methods, as necessary, to improve results and meet success criteria. Monitoring reports to be submitted annually to the County.

2.5.1 Planned Reclamation

Each major component of the mining and mineral recovery facilities will be reclaimed to reduce long-term impacts. An overview of planned reclamation is listed below, followed by more specific measures discussed in Reclamation Phases and in Section 2.10 for tailings and storage ponds. Figure 19 and Sheet 5 depict final contours of the reclaimed site.

Open Pit

Pit slopes will be excavated as designed and based on ongoing slope stability assessments and MSHA guidelines (refer to Section 1.1.4 and Figure 9). Golder's "Slope Stability Evaluation" (2002) calculated Factors of Safety (FOS) of 2.3 for static conditions and 1.8 for pseudo-static conditions. A 6-foot high safety berm will be constructed along the rim of the pit to block vehicle entry and the access roads will be blocked by large rocks upon pit closure. Prominent safety signs will be erected as necessary.

Revegetation efforts in the open pit will be limited in scope due to the hard rock slopes and the absence of soil cover. Over time, natural weathering and sloughing will result in the accumulation of material on the benches, which will allow natural revegetation to occur. Ponding of ground water will form a terminal pit lake. The water level will rise to its natural static level in approximately 40 years of about 4,200 feet MSL, about 500 feet below the pit rim. Geomega has assessed water quality modeling of the potential pit lake.

Overburden Stockpiles

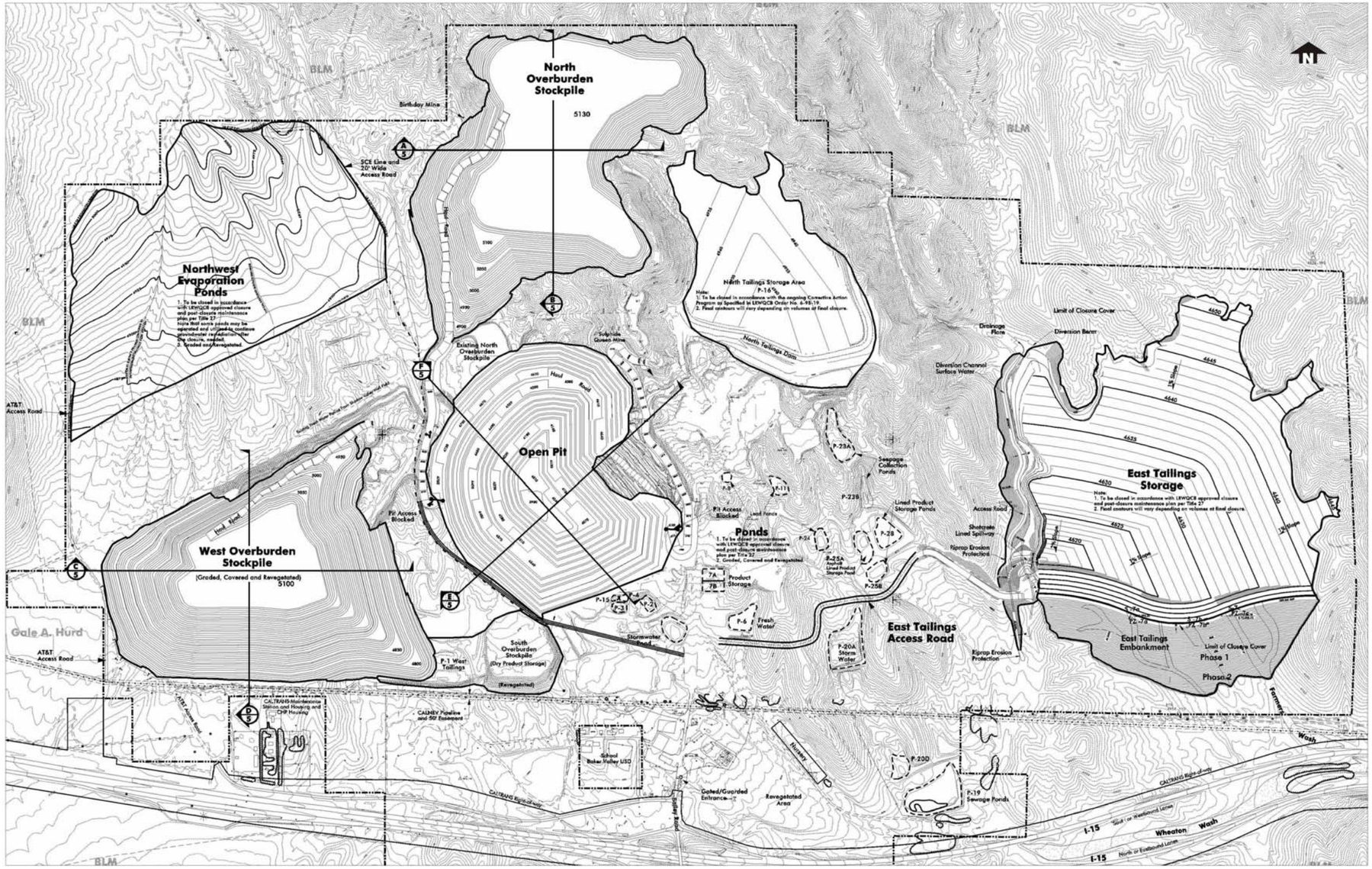
The overburden stockpiles will be developed from the outside perimeter inward instead of the typical construction of outward expansion. This will allow reclamation of the lower slopes as the lift immediately above it is completed. The slopes will be reclaimed by dozing the crest or lip of each bench to create an overall 2.3H:1V slope to blend with the surrounding landscape. The slope faces will be sculptured to recreate natural appearing slopes and to create islands and pockets to enhance revegetation. The sculptured surfaces and the covering of the slopes with salvaged surface material will aid in capturing seeds and moisture to facilitate revegetation and stability. The stockpile slopes will be reclaimed as follows:

- Construct and final grade the slope faces to an overall 2.3H:1V (2H:1V face slopes with 15-foot benches) from active slopes of 1.33H:1V as depicted in Figure 20.

- Grade to include substantial surface undulations, sculpturing, islands, and terracing to provide areas for natural water and seed collection and enhanced revegetation.

- Cover slopes with smaller sized and/or crushed overburden to reduce rocky conditions and with coloring to blend into the surrounding natural terrain followed by stored surface material to enhance revegetation.

- Revegetate slopes with broadcast seeding and "pocket planting" with rock adaptable native plants and seeds.



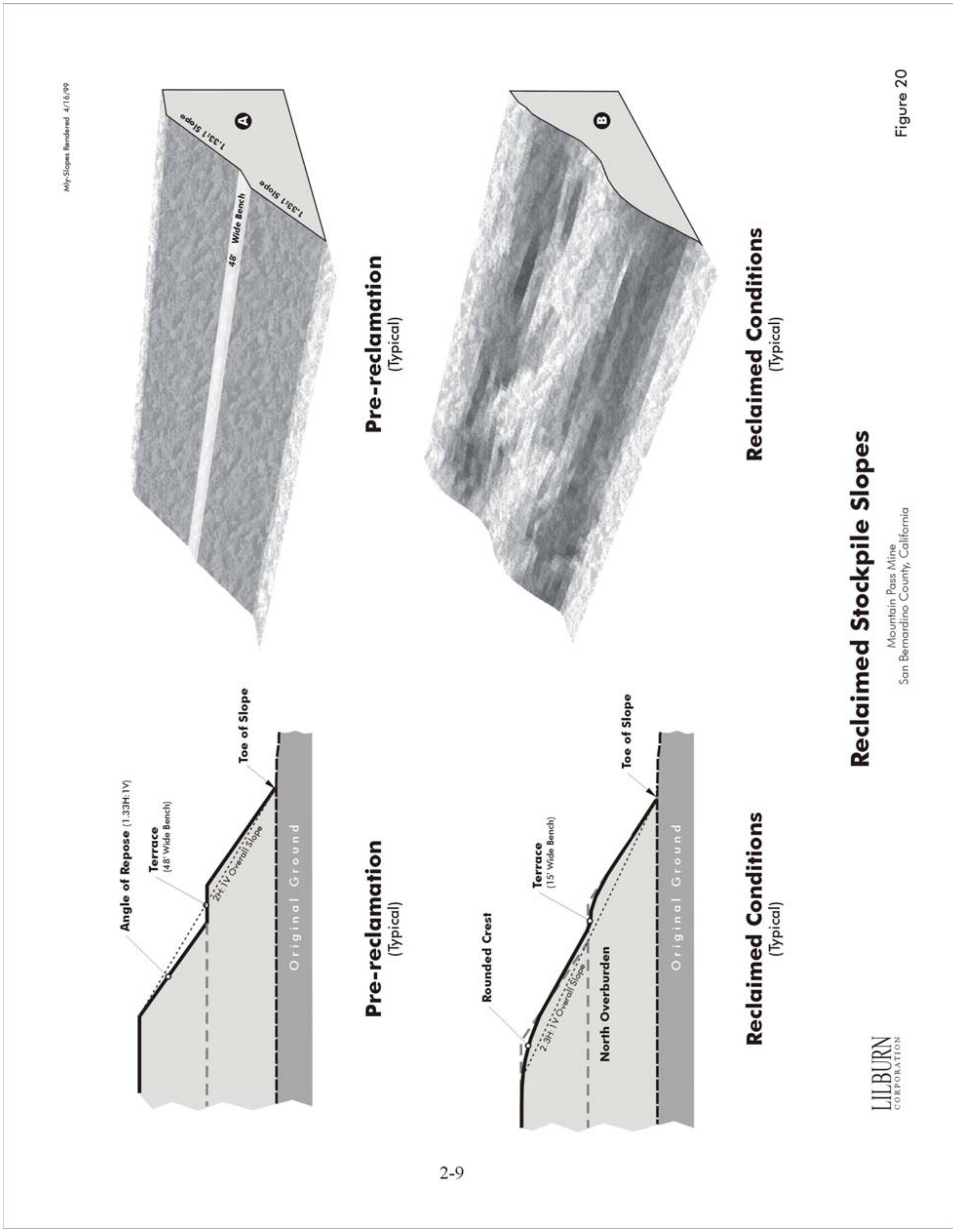
Reclamation Plot Plan

Mountain Pass Mine
San Bernardino County, California

Prepared By:
LILBURN CORPORATION

2-8

Figure 19


Mly-Slopes Rendered 4/16/99
Angle of Repose (1.33H:1V)
Terrace
(48' Wide Bench)
2H:1V Overall Slope
Toe of Slope
Original Ground
Pre-reclamation
(Typical)
Rounded Crest
Terrace
(15' Wide Bench)
2.3H:1V Overall Slope
North Overburden
Toe of Slope
Original Ground
Reclaimed Conditions
(Typical)
1.33:1 Slope
48' Wide Bench
1.33:1 Slope
A
Pre-reclamation
(Typical)
B
Reclaimed Conditions
(Typical)
Reclaimed Stockpile Slopes
Mountain Pass Mine
San Bernardino County, California
Figure 20
LILBURN
CORPORATION
2-9

Tailings Storage Areas

The existing North Tailings Storage Area (P-16) was utilized for two operational periods that ended in November 2002 and is to be closed by October 1, 2004 in accordance with the RWQCB Order 6-00-101. A preliminary Closure and Post-Closure Maintenance Plan and schedule for closure are included in a Provision of this Order. The approved Final Closure and Post-Closure Maintenance Plan will be implemented per Title 27, Chapter 7 with detailed closure methods determined depending on site and regulatory conditions.

Upon reaching capacity, the planned East Tailings Storage Area would be closed in accordance with a RWQCB approved closure and post-closure maintenance plan. Detailed closure methods would be determined prior to the actual closure depending on site and regulatory conditions. In concept, the surface water would be dewatered and allowed to evaporate and the tailings surface graded to provide perimeter drainage to natural channels. A closure cover will be installed per Title 27, Section 21090, which would consist of a foundation layer, a geomembrane to minimize infiltration, a one-foot thick layer of finer gradation material so as not to damage the liner, and then a one-foot thick erosion resistant layer of overburden and stockpiled surface material suitable for revegetation. A post-closure maintenance and monitoring plan would be implemented throughout the required 30-year post-closure period or longer if the tailings pose a threat to public health and safety or to water quality. The tailings storage area would be designated as a closed waste management unit.

Northwest Evaporation Ponds

Upon site closure, the onsite evaporation ponds will be closed in accordance with applicable regulations in Title 27. Note that some of the ponds may be operated and utilized to continue ground water remediation activities after site closure, if needed.

The sequence of closure will be from the up gradient cells to the down gradient cells. This will enable the flushing of sediments and any salt from the upper cells downstream to the lower cells. After clean closure of the upper cells, the lower cells will be subject to dry-out and salt harvesting. The harvested salt will be managed appropriately according to applicable regulations or sold as a product if a market for the salts is identified.

The lining systems, pumps, pipes, and ancillary facilities will be removed with material reused and recycled if possible or properly disposed of. The ponds will be graded to reestablish natural contours and surface drainage, covered with surface material, and then revegetated.

In the event that the final salt and sediment are encapsulated on site in one or more of the cells, a closure and post-closure maintenance plan will be prepared and submitted to the RWQCB for approval. Post-closure maintenance is not required for those cells that are clean-closed.

Mineral Recovery Plants

Following termination of mining and if no future mining and mineral recovery activities are planned or approved, buildings, facilities, and equipment deemed un-necessary for future uses, will be decommissioned and removed. Equipment, surplus materials, stockpiled product, and

fuel and water tanks would be sold, removed, reused, recycled and/or disposed of in accordance with applicable regulations. Surface pipelines, building pads, and foundations will be removed; and underground pipelines plugged/sealed in accordance with applicable requirements and buried in-place (or removed if required). This will avoid additional disturbances on areas over pipelines that have naturally revegetated. Reclaimed areas will be regraded for positive drainage, scarified, and revegetated. Note that depending on the future use of the site, some buildings and infrastructure may be left in-place. Any remaining safety hazards will be remediated.

Onsite Ponds

Twelve-onsite wastewater ponds were clean closed between 1987 and 1991 in compliance with State regulations and with the approval of the RWQCB as discussed in Section 1.4.3. The currently active lined product storage ponds, mill/flotation plant ponds, sewage, seepage, freshwater, and stormwater ponds, and inactive lead ponds will be closed and reclaimed in compliance with Title 27, Chapter 7 with RWQCB approved closure and post-closure maintenance plans.

As part of the site's Corrective Action Program, continued sampling, monitoring, and remediation of ground water will be undertaken until ground water quality no longer poses a threat to public health and water quality. Note that the existing active and inactive ponds will be closed through implementation of approved closure and post-closure maintenance plans with or without approval of this Reclamation Plan. The planned closure of these ponds is discussed in more detail in Section 2.10. Two new additional ponds, the Northwest Evaporation Ponds and the East Tailings Storage Area, are discussed under separate headings.

Roads and Other Compacted Areas

Roads deemed non-essential for access, maintenance, and other future uses of the site and other compacted operational areas will be scarified and revegetated as set forth in this Reclamation Plan.

2.5.2 Reclamation Phases

A phased reclamation schedule is proposed which coincides with the Mining Phases discussed in Section 1.1.5. Revegetation methods are described in Section 2.6 and detailed in Appendix E.

Phase 1 (15-Year Period Following Approval)

Prior to expansion of the mine activities onto areas not previously disturbed, the following actions will be undertaken in order to facilitate ongoing and future reclamation and revegetation requirements:

- Conduct plant surveys on areas to be disturbed during this phase (approximately 556 acres conducted over many years dependent on actual expansion) by qualified personnel to determine the types and number of native plant species in expansion areas so as to establish baseline revegetation goals, and to identify and flag sensitive species and

other plants including Joshua trees, yuccas, and cacti suitable for transfer to a holding nursery or to landscape/reclaim other areas of the facility.

- Collect seeds where practical for specified species for revegetation.

- Remove and transplant identified plants to a holding nursery or to other areas to be landscaped/reclaimed.

- Offer to third parties, Joshua trees, yuccas and other plant species deemed unsuitable for transplanting onsite.

- Stockpile surface material or growth media to act as a seed source and for future reclamation into separate identified piles protected from wind and water erosion, or utilize for concurrent reclamation. Over the 15-year Phase 1 period, approximately 100,000 cubic yards (CY) of surface material will be available from the West Overburden Stockpile Area, 139,000 CY from the Northwest Evaporation Ponds area, 60,000 CY from the North Overburden Stockpile Area, and 62,000 CY from the drainage channels and rocky surface in the East Tailings Storage Area. (Please refer to Section 2.11 for discussion on available surface material.) Short falls in the availability of surface reclamation materials may be supplemented by acceptable crushed overburden.

- Establish an onsite holding nursery to maintain salvaged plants and to propagate specified plant species for ongoing revegetation and landscaping (a storage area has been utilized east of the main entrance in the old camp area). Note that an offsite nursery may be contracted to store and propagate plants.

- Mine pit to produce stable slopes as recommended by slope stability analysis reports.

- Reclaim lift slopes of the West Overburden Stockpile as the lift immediately above it is completed. Reclamation will include slope reduction and sculpturing, covering with surface material, revegetating by seeding and transplanting.

- Close, reclaim, and monitor any inactive ponds in accordance to RWQCB approved closure and post-closure maintenance plans.

- Reclaim and revegetate areas no longer utilized for operations especially areas north of and adjacent to I-15.

- Monitor revegetation results by preparing assessments and provide an annual report of the monitoring results to the County.

Phase 2 (Years 16 Through 30 Following Approval)

- Conduct plant surveys on areas to be disturbed during this phase (approximately 141 acres prior to expansion) by qualified personnel to determine the types and number of native plant species in expansion areas to identify sensitive species and other plants

including Joshua trees, yuccas, and cacti suitable for transfer to a nursery or to landscape/reclaim other areas of the facility and collect seeds.

- Complete reclamation and revegetation of West Overburden Stockpile.

- Continue ongoing reclamation measures as described under Phase 1. Available surface material for this phase is estimated at 86,000 CY.

- Reclaim slopes of the North Overburden Stockpile as the lift immediately above it is completed. Reclamation to include slope reduction and sculpturing, covering with surface material, revegetating by seeding and transplanting.

- Close, reclaim, and monitor any inactive ponds in accordance to RWQCB approved closure and post-closure maintenance plans.

- Reclaim and revegetate areas no longer utilized for operations.

- Monitor revegetation results by preparing assessments and provide an annual report of the monitoring results to the County.

Phase 3 (Years 31 Through 40 Following Approval)

The final reclamation phase is outlined in Section 1.1.5 and reiterated below with additional detail. Note that Title 27 requires a 30-year monitoring period for closed mine waste management units.

- Construct a 6-foot high safety berm along the rim of the pit and on access roads to block vehicle entry upon pit closure. Erect prominent safety signs as necessary.

- Contour, scarify, and cover the unreclaimed portions of the North Overburden Stockpile with available surface material to enhance revegetation and to reduce visual impacts.

- Close, reclaim, and monitor ponds in accordance to RWQCB approved closure and post-closure maintenance plans.

- Close, reclaim, and monitor the East Tailings Storage Area in accordance with a RWQCB approved closure and post-closure maintenance plan.

- Safely remove, recycle and/or dispose of all hazardous materials and waste in accordance with applicable Federal and State laws as discussed previously.

- Remove buildings, tanks, and equipment not necessary for remediation, recycling, future mining, or other future permitted activities.

- Properly clean all equipment and containers and recycle or dispose of in accordance with applicable laws.

- Spread available stockpiled surface material on areas to be revegetated.

- Revegetate disturbed areas.

- Monitor revegetation results by preparing quarterly assessments through the first two years and an annual plant survey of the area as necessary. An annual report of the monitoring results will be provided to the County.

2.6 REVEGETATION

A detailed Revegetation Plan which includes specifics on the existing vegetation, proposed methods of revegetation, types and numbers of native species to be used for revegetation, success goals and monitoring is included as Appendix E.

The goal of the revegetation program is to control wind and water erosion, reduce visual impacts, and reestablish habitat for native plants and wildlife. Revegetation on those areas reclaimed to open space must be compatible with existing natural habitat on adjacent undisturbed areas. Only native species, which already occur on the site, will be utilized and the genetic balance of the area will be maintained by avoiding the introduction of genetic material from outside the immediate vicinity wherever possible. Soils surveys will be conducted on salvaged surface material used for revegetation to determine the need for soil amendments.

Past revegetation efforts onsite include the salvaging of Joshua trees, yuccas, and cacti from the expansion of the West Overburden Stockpile and the Stage 1 evaporation ponds. Some of these removed plants were planted throughout areas of the facility, particularly in the areas east and west of the mine entrance station and on the recontoured south slopes of the South Overburden Stockpile. A temporary holding area has been set up in an area 1,000 feet east of Bailey Road (refer to Figure 11). In addition, removed surface material has been placed on the slopes of the South Overburden Stockpile.

2.6.1 Revegetation Plan Summary

A summary of the planned revegetation plan is listed below. Specific revegetation methods and plant species (type, amount of seed, etc.) may be revised in future years as results of other research and when test plot studies become available. In general, the following guidelines will be followed:

Prior to Clearing

- Survey areas to be disturbed to assess the ground cover, plant density, and species composition in order to establish baseline revegetation goals.

- Identify, flag, and transplant specific plants suitable for removal to other areas to be reclaimed or to the holding nursery and offer to third parties Joshua trees and yuccas unsuitable for transplanting.

- Collect seed from specified plant species.

- Take cuttings from suitable plants under the supervision of qualified personnel.

- Stockpile surface material into separate identified stockpiles or for immediate use on areas being reclaimed. If surface material is stored, the stockpiles shall be identified and covered with larger rock or planted with erosion control seed mix to reduce erosion.

Ongoing Propagation

- At a contracted nursery or on an onsite holding nursery, propagate seeds and test cuttings on various native species.

- Maintain transplanted plants, seeds and seedlings to supply ongoing revegetation.

- Assess success of seeding and transplanted plants and cuttings in test plot areas to be established.

Site Preparation

- ***Subsurface*** - Final overburden dumped or used for "topsoil" will be crushed and/or a finer overburden mixture deposited to provide a more favorable subsurface for root establishment.

- ***Soil Scarification*** - Compacted areas will be ripped to a one-foot minimum depth (if possible due to numerous rock outcrops), with surface rills and furrows left to aid in water and seed collection.

- ***Growth Media*** - Topsoil or rootline materials that have been stockpiled will be spread on benches and slopes and partially mixed with underlying scarified material.

- ***Land Shaping*** - Final contours will be designed for necessary drainage and for natural appearing slopes and landforms.

- ***Rock Placement*** - Surface boulders are significant components of the undisturbed hillsides in the area and will be placed irregularly on reclaimed areas to aid in collection of wind-blown seeds and to reduce visual contrasts.

- ***Dead Wood Placement*** – Dead wood or Joshua tree logs are also a component on undisturbed hillsides and will be placed irregularly on reclaimed areas to serve in a similar function to that of rocks and as a source of plant nutrients and animal habitat.

Revegetation

Revegetation of specific phased out areas of the site will be ongoing throughout the lifespan of the mine. Upon termination of mining, remaining disturbed areas will be reclaimed and

revegetated within two years. Ongoing assessment of revegetation test plots and other revegetation research, will determine which type of propagation and which species are most appropriate for revegetation. In general, the following types of methods will be used for revegetation:

Broadcast Seeding - Seed will be collected from the site in amounts estimated for the next year's seeding efforts. Collection will occur under the supervision of qualified personnel. Commercially available seeds of native species may also be used to augment natural seed production and to aid in erosion control. Seeding will take place before winter precipitation (mid-October to mid-December) to eliminate the need for irrigation.

Transplantation – When available, individual plants from areas to be disturbed as selected by qualified personnel, will be transplanted to areas being reclaimed or stored in the onsite nursery. This method will be dependent upon the size, condition, root system, and sensitivity of the various plants to this type of disturbance.

Containerized Plants – Specific shrubs and trees will be propagated in a nursery and transplanted when seasonally favorable conditions exist.

Cuttings - Cuttings will be used to revegetate individuals in which seed is difficult to collect. Standard cutting techniques will be used and all cuttings will be conducted under supervision of qualified personnel.

Broadcast seeding will be attempted with many species, with cuttings and containerized plants utilized for some tree and shrub species. Seeds will be covered with soil on benches, pockets, and slopes (unless not feasible due to rocks) by covering with soil or dragging a chain over the loosened, unseeded surface to increase germination. Containerized plants will be watered on placement. Fall planting is scheduled to maximize survivability of the cuttings and containerized plants. Seeds or plantings will be dependent on the natural rainfall. Pocket planting, the construction of islands or terraces for revegetation, will be interspersed on steep and/or rocky slopes. Note that the revegetation of final covers placed over closed and contained waste management units (eg. - tailings storage areas), cannot impair the integrity of the containment features. The rooting depth of native plantings on covers shall not exceed the depth to the top of the low-hydraulic-conductivity layer. Therefore, some changes in the natural plant diversity may be necessary for the closure caps.

Some of the plants that are found on the site and which will be used in the general revegetation effort, and methods for their possible propagation are listed below.

Yuccas

Yucca brevifolia - Joshua tree, *Y. baccata* - banana yucca, and *Y. schidigera* - Mojave yucca: broadcast seeding and grown from seeds and transplanted.

Shrubs

Ephedra viridis – Morman tea or Mountain Joint fir and *E. nevadensis* - Nevada joint fir: grown from seed and transplanted.

Guiterrezia microcephla - Matchweed: broadcast seeded or grown from seed and transplanted.

Haplopappus cooperi - Cooper's goldenbush and *H. linearofolius* - linear-leaved goldenbush: broadcast seeding.

Larrea tridentata – creosote: broadcast seeding.

Atriplex canescens - wingscale: broadcast seeded.

Eriogonum fasciculatum - California buckwheat: broadcast seeded.

Coleogyne ramisissima - blackbrush: grown from seed and transplanted.

Prunus fasciculata - desert almond: direct seeding and grown from seeds and transplanted.

Agave utahensis var. nevadensis - Clark Mountain agave: broadcast seeding.

Cacti

Opuntia basilaris - Beavertail cactus, *O. chlorotica* - pancake cholla, *O. erincea* - old man prickly-pear and *0. acanthocarpa* - buckhorn cholla: grown from cuttings and transplanted or placement of unrooted cuttings.

Grasses

Bouteloua barbata - six-week grama grass, *Hilaria jamesii* - galleta, and *H. rigida* - big galleta grass: broadcast seeding and nursery-grown divisions.

Stipa parishii - porcupine grass: broadcast seeding and nursery grown divisions.

Oryzopsis hymenoides - Indian rice grass: broadcast seeding and nursery grown divisions.

Specific seeding rates will be determined and adjusted after the plant transects of undisturbed areas have been completed in order to achieve relative distribution of actual occurring species. It should be noted that much of the plant communities onsite are a mature or climax stage of development. It will also depend on the availability of onsite seed, commercially available seed, and actual revegetation results. As many species as possible now present on the site will be included in the revegetation effort. It is also expected that many species will naturally revegetate on the new areas as mining activities move to new areas or cease.

2.6.2 Revegetation Monitoring

A vital part of the revegetation program will be the monitoring of the efforts and results and implementation of remedial or maintenance activities. Remedial or supplemental efforts to achieve the desired success rate may include:

- Reseeding and using varied seeding mixes and rates;
- Replanting;
- Removal or suppression of invasive exotic weed species such as Russian thistle (*Salsola iberica*) and tamarisks (*Tamarix*);
- Adding soil amendments; and
- Protecting plantings from wildlife and livestock from adjacent rangelands.

The ongoing revegetation efforts will be monitored throughout the lifespan of the mine and will be summarized annually as part of the overall Monitoring Program to confirm compliance with SMARA revegetation guidelines. Monitoring will continue for ten years following closure and results annually reported to the County.

2.7 CLEANUP

Scrap material, refuse, unwanted equipment, and surplus materials will be removed and disposed of at an appropriate landfill site. Excess material piles and disturbed areas will be regraded for positive drainage, scarified, and revegetated. Note that depending on the future use of the site, some buildings and infrastructure may be left in-place. The central portion of the site containing closed waste management units will be fenced and any other potential public safety hazards will be remediated.

2.8 POST-RECLAMATION AND FUTURE MINING

Upon completion of reclamation, the site will be composed of a 118-acre open pit with a pit lake; two reclaimed and revegetated overburden stockpiles totaling 300 acres; closed, covered and revegetated evaporation ponds and North and East Tailings Storage Areas; and revegetated plant and ancillary facilities areas. Depending on the future use of the site, some buildings and infrastructure may be left in-place. Reclamation of the site should not affect future use of the property or adjacent and nearby lands for mining and/or mineral recovery purposes.

One of the goals of SMARA and the Reclamation Plan is to reclaim the site to a usable condition available for other land uses. Subsequent uses of the site may potentially include some or all of the following:

(1) Habitat for native desert wildlife and plants
(2) Future mining of the unique mineral resource onsite

(3) Recovery of lanthanides from tailings and low grade ore
(4) Use of overburden for construction aggregate
(5) Continued use as a transportation and utility corridor
(6) Geological research and field studies
(7) Rangeland for domestic livestock.

2.9 SLOPES AND SLOPE TREATMENT

Open Pit

Rock slope stability within the open pit is influenced by structural geology (joints, foliation planes, shear or fault zones), groundwater conditions (that may reduce shear strength and cohesion and develop seepage forces and tension cracks), and blasting forces. The rock slope stability is and will be continually assessed as each new pit level is excavated. A recent evaluation of the pit slopes is included in Appendix D. This report assessed the stability of the designed 30-year pit (refer to Figure 9) with maximum slope angles of 50° and overall slope angles of 1H:1V or 42°. The evaluation determined that the final pit geometry would be stable and that adequate slope stability factors of safety of 2.3 for static conditions and 1.8 for pseudo-static conditions will be achieved, which exceed closure requirements and conform to the end use of the pit.

Bench intervals and slope angles may vary depending on the location of the haul road, local faulting, ground water, rock type and strength, and blasting techniques. Slopes are monitored visually to detect any large-scale movement. In addition, slopes will be subject to review by Mines, Safety, and Health Agency (MSHA).

Overburden Stockpiles

The west, south, and east stockpile faces will be constructed in 50-foot vertical lifts. Overburden is dumped at its angle of repose (37º or 1.33H:1V) with a slope width of 67 feet and an 48-foot wide bench (refer to Figures 13 and 20). The slopes will be reclaimed and further stabilized by dozing the crest or lip of each bench to create an overall 2.3H:1V slope with the slope faces of 2H:1V and a 15-foot wide bench. The faces will also be sculptured to recreate natural appearing slopes and to create random islands, terraces, uneven surfaces, and pockets to capture wind-blown and broadcast seeds and moisture. This reclamation grading will facilitate revegetation and slope stability, reduce erosion, and reduce visual impacts from un-natural manufactured slopes. The slopes will be covered with smaller sized and natural colored overburden and salvaged surface material or growth media to reduce color contrasts and to prepare the surface for seeding. The areas will then be revegetated with broadcast seeding and transplanting methods.

2.10 PONDS, TAILINGS, AND MINE WASTES

Twelve-onsite wastewater ponds were clean closed between 1987 and 1991 in compliance with State regulations and with the approval of the RWQCB as discussed in Section 1.4.4. The currently active lined product storage ponds, mill/flotation plant ponds, seepage, sewage,

freshwater, and stormwater ponds, and inactive lead ponds will be closed and reclaimed in compliance with Title 27, Chapter 7 with RWQCB approved closure and post-closure maintenance plans. As part of the site's Corrective Action Program, continued remediation and monitoring of groundwater will be undertaken until ground water quality does not pose a threat to public health and water quality.

The two new additional pond areas, the Northwest Evaporation Ponds and the East Tailings Storage Area, which are part of the CUP, are discussed under separate headings.

Northwest Evaporation Ponds

Upon site closure, the onsite evaporation ponds (consisting of two of four ponds constructed in 2000 for groundwater recovery evaporation and the planned 133 acres of additional ponds) will be closed in accordance with applicable regulations in Title 27, Chapter 7 and approved by the RWQCB. Note that some ponds may be utilized after operations are terminated to continue ground water remediation activities, if needed.

The sequence of closure will be the up gradient to the down gradient cells. This will enable the flushing of sediments and any salt from the upper cells downstream to the lower cells. During normal operation of the pond system, the majority of salts precipitated from the evaporate water will collect in the lower or downgradient cells. After clean closure of the upper cells, the lower cells will be subjected to dry-out and salt harvesting. The harvested salt will be managed appropriately according to applicable regulations or sold as a product if a market for the salts is identified.

The lining systems, pumps, pipes, and ancillary facilities will be removed with material reused and recycled if possible or properly disposed of. The ponds will be graded to reestablish natural contours and surface drainage, covered with surface material, and then revegetated.

If the salts are stored or incapsulated in the lower cells, a post-closure maintenance plan will be implemented including maintenance of the cap and ground water monitoring. Post-closure maintenance is not required for those cells that are clean closed.

Product Storage Ponds

Reclamation or closure of each product storage pond must comply with the RWQCB requirements for closure under Title 27, Chapter 7. Detailed closure methods will be determined prior to the actual closure depending on site and regulatory conditions and will be approved by the RWQCB prior to implementation. The currently active product storage ponds that may be used through the 30-year planning period include seven product ponds discussed in Section 1.2.1 and listed in Table 5.

Conceptually, the clean closure and reclamation of the product storage ponds may consist of the following:

- Removal and sale or proper disposal of any remaining product;

- Disposal of any ponded water by discharge to the site's wastewater treatment facilities and reuse the water in the mineral recovery operations or disposal to the Northwest Evaporation Ponds;

- Removal, treatment or disposal of contaminated clay or synthetic liners to approved treatment or disposal sites;

- Breakup and/or removal of any concrete/asphalt cells, channels, etc. and salvage any pipes or pumps;

- Analyze soil samples from under the concrete/asphalt or membrane liner to confirm clean closure;

- Grade berms into pond area to approximate original contours to facilitate surface drainage; and

- Revegetate to control wind and runoff erosion.

Lead Ponds

The three lead ponds (P-8, P-11, and P-24) are shallow basins with soil dams and berms, located generally south-southeast of the mineral recovery plants. They were used in the past to hold mill tailings and to collect lead/iron filtrate and have been inactive since 1984. These ponds are in the process of being closed in accordance with CCR Title 27; Chapter 7 with RWQCB approved closure plans and post-closure maintenance and monitoring plans.

Mill Ponds

The three mill/flotation ponds (P-2, P-4, and P-15) are located immediately to the south of the mill/flotation plant (refer to Figure 11). These ponds will be closed in accordance with CCR Title 27, Chapter 7 with a RWQCB approved closure and post-closure maintenance plans.

P-2 is an active pond utilized for emergency mill shut down. The pond consists of three concrete cells each approximately 35 feet by 70 feet at a depth of 2.5 feet. Wash water, products, and reagents from the mill/flotation plant and thickener tanks are drained into P-2 to prevent product from solidifying in the system. When power is restored, the liquids are decanted and pumped back to the mill/flotation plant.

Conceptually, any water ponded prior to closure will be discharged to the site's wastewater treatment system and reused in the mineral recovery operations or disposed of into the Northwest Evaporation Ponds; any remaining product or tailings in the pond will be removed and reintroduced to the mill/flotation plant or disposed into the East Tailings Storage Area; the concrete cells broken up and left in-place; surface material spread over the pond; graded to drain; and revegetated.

Ponds P-4 and P-15 are now inactive but were used for overflow or product storage and/or spillage. Both ponds are less than 0.25 acres and are lined. Again the ponds will be closed as described for P-2 above except that instead of concrete cells, these ponds will have their liners removed and disposed of appropriately. Soil samples to confirm clean closure will be collected to ensure that pond sediments have been removed. If samples meet cleanup standards, the ponds will be graded to drain and revegetated.

Tailings Storage Ponds

West Tailings Pond (P-1) – The closure of P-1 is being undertaken with Waste Discharge Requirements (WDRs) as approved under the RWQCB Order No. 6-00-74 adopted in September 2000. The WDR approved a final cover for the site and the Closure and Post-Closure Monitoring and Maintenance Plan. P-1 will be closed in-place and provided with a cover that diverts surface water and prevents infiltration. The cover will be composed of (from top to bottom): (1) a minimum of 6-inches of native soil for revegetated grasses; (2) 1.5 feet of select cover soil composed of minus one-inch material from screening onsite soils or overburden; (3) a geocomposite layer composed o a layer of sodium bentonite clay sandwiched between and bonded to two layers of nonwoven geotextiles; and (4) two feet of prepared foundation material consisting of compacted tailings. Post-closure ground water and cover integrity monitoring will be undertaken.

South Tailings Pond (P-3) - The South Tailings Pond was clean-closed in 1987. As part of the site investigation and correction action, P-3 is being re-sampled to characterize any remaining constituents that may be impacting ground water.

North Tailings Storage Area (P-16) - The existing North Tailings Storage Area (P-16) was utilized for two operational periods that ended in November 2002 and is to be closed by October 1, 2004 in accordance with the RWQCB Order 6-00-101. A preliminary Closure and Post-Closure Maintenance Plan and schedule for closure are included in a Provision of this Order. The approved Final Closure and Post-Closure Maintenance Plan will be implemented per Title 27, Chapter 7 with detailed closure methods determined depending on site and regulatory conditions.

Conceptually, the surface water pond will be drained and the water pumped for reuse in the mineral recovery operations or treated through the onsite water treatment facilities. Potential runoff from surrounding areas will be diverted by perimeter ditches to natural drainages. The tailings will be allowed to dry and consolidate. A closure cover will be installed per Title 27, Section 21090, which typically will consist of a 2-foot foundation layer, a geomembrane or low permeable soil layer to minimize infiltration, a one-foot layer of finer gradation material so as not to damage the liner, and then a one-foot thick erosion resistant layer of overburden and stockpiled surface material suitable for revegetation. Tailings may be reclaimed in the future by implementation of new refining processes to recycle and reduce tailings.

East Tailings Storage Area - Upon reaching capacity, the East Tailings Storage Area would be closed in accordance Title 27 with a RWQCB approved closure and post-closure maintenance plan. Detailed closure methods will be determined prior to the actual closure depending on site and regulatory conditions.

Conceptually, the surface water pond would be dewatered and allowed to evaporate, the tailings allowed to consolidate, and the tailings surface graded to provide perimeter drainage to natural channels. A closure cover will be installed per Title 27, Section 21090, which will consist of a 2-foot foundation layer, a geomembrane to minimize infiltration, a one-foot thick layer of finer gradation material so as not to damage the liner, and then a one-foot thick erosion resistant layer of overburden and stockpiled surface material suitable for revegetation. A post-closure maintenance and monitoring plan will be implemented throughout the 30-year post-closure period or longer if the site poses a threat to public health and safety or to water quality. The site would be designated as a closed waste management unit.

Seepage Ponds

Seepage from the North Tailings Storage Area (P-16) is collected in two small ponds located down gradient and southeast of the North Tailings Dam. Both ponds are unlined earthen basins; P-23A is approximately 1.8 acres and P-23B is about 0.26 acres. The ponds will be closed in accordance with Title 27 with a RWQCB approved closure plan and post-closure maintenance plan.

Conceptually, any water ponded prior to closure will be discharged to the site's wastewater treatment system and reused in the mineral recovery operations or disposed of into the Northwest Evaporation Ponds; settled tailings in the pond will be removed (estimated depths of 1 to 3 feet) and reintroduced to mill/flotation plant or disposed into the North or East Tailings Storage Areas; soils will be sampled to confirm clean closure; the embankment removed and spread over basin; graded to drain; and revegetated.

Stormwater Ponds

Stormwater collection ponds would remain in-place until operational and remediation activities are terminated onsite. The stormwater detention ponds (P-20A and D) are unlined ponds while the recently constructed pond southeast of the mill/flotation plant is lined. The ponds will be closed in accordance with Title 27 with RWQCB approved closure plans.

Conceptually, any water ponded prior to closure will be sampled and if found to be clean, the water will be allowed to drain down natural drainages. If the ponded water were found to contain contaminants, then the water would be pumped to the site's wastewater treatment system. For P-20A and D, a channel will be cut through the embankment to allow continuous drainage. The channel bottom and 2H:1V channel slopes would be lined with rip-rap. Soil samples from the basin would be analyzed to confirm clean closure. The basin will be revegetated and any tamarisks or other exotic species removed.

After removal of any ponded water, the stormwater containment pond near the mill will have its liner removed, soil samples analyzed to confirm clean closure, then backfilled to grade.

Sewage Pond (P-19)

The sewage pond is a shallow unlined basin that accepts domestic sewage that has been pretreated in septic tanks. The pond is operated under RWQCB Order No. 6-01-18 adopted in April 2001 and will be closed in accordance with Title 27 with a RWQCB approved closure plan. Any water ponded prior to closure will be sampled and if found to be clean, the water will be allowed to drain down natural drainages. If the ponded water were found to contain contaminants, then the water would be pumped to the site's wastewater treatment system. The berm material will be graded into the basin, which will be contoured to drain then revegetated. Any natural Desert Wash vegetation will be left in-place and tamarisks or other exotic species will be removed. Soil samples from the basin would be analyzed to confirm clean closure.

Freshwater Pond (P-6)

The freshwater pond (P-6) is located immediately to the east of the administrative offices. It is filled with clean freshwater and was constructed to create a park-like area for employees. This pond would be allowed to dry out, its banks graded to near normal elevations, and revegetated.

2.11 SOILS

Soils on the site consist of gravels and alluvium at various thicknesses dependent on location. Much of the site from just south of the ore body northward and eastward is underlain with various types of hard rock with little soil or loose surface material. Alluvium and gravel cover extensive areas west of the pit area.

A reclamation-oriented, topsoil salvage soil survey was conducted onsite by ENSR and is summarized below. Soils were investigated in the numerous, large, existing backhoe pits that were created throughout the area during mineral exploration. In addition, smaller excavations also were conducted with the use of spades to complete further soil investigations. Soils were characterized in the field and soil mapping units were delineated for the mine site (refer to Figure 18).

Two soil types dominate the planned western expansion areas. The first soil (the Sunrise-like soil series) is found on the extensive alluvial fans, which cover the western part of the site. These fans extend from the higher elevation Clark Mountain terrain to the north. In some parts of the western area, the surface soil layer is disturbed from earlier mining exploration, construction access, and vehicle use. The soil is characterized by a coarse-loamy texture and consists of mixed, alluvial materials.

Undisturbed Sunrise-like soils on the alluvial fans (mapping unit AF) are typically located on slopes of less than 3 percent of alluvial fan tops, and up to 20 percent on fan sideslopes above intermittent drainages which intersect the alluvial fans. These soils support a plant community dominated by Joshua trees and blackbrush; are generally formed from deposition of transported alluvial material; and are excessively drained and weakly developed. The soils are moderately deep to deep sandy loams (surface layer), have poor water retention properties, and contain stratified lenses of sand and gravels at depth. Loams generally consist of a mixture of silt, clay,

sand, and organic material. Some lenses contain cobbles or stones. All observed profiles had a calcium-cemented layer usually just below the surface layer, at an average depth of about 7 inches.

The surface layer of the Sunrise-like soil series is a light yellowish brown gravelly to very gravelly or cobbly sandy loam about 7 inches thick. Surface coarse fragments of gravel and cobble average about 25 percent of the total volume. This layer is suitable for reclamation.

The next layer (soil substratum) of the Sunrise-like soil is a white, hardened, very gravelly to cobbly loamy sand, calcium-cemented horizon. The soils present in this layer are moderately or strongly alkaline. Beneath this layer are alternating calcium-cemented lenses and loose sand and gravel layers. Neither the soil substratum nor the underlying material are ideal for reclamation use but may be suitable for this environment. Coarse soils can be beneficial in the desert environment as they contain surface microhabitats around the rocks for windblown soil fines and seeds. These coarse soils may also act as rock mulch to retain moisture.

The second of the two most dominant soils (the Arizo-like soil series) observed on-site is found in the intermittent drainage and low terraces that intersect the alluvial fans. This soil series (mapping unit C) occupies the drainage channels that intersect the alluvial fans. Up to 10 or more channels or channel tributary segments are present in the planned West Overburden Stockpile and Northwest Evaporation ponds area. In addition, about five drainage channels or channel tributary segments are located in the eastern portion of the mine site at the planned location of the East Tailings Storage Area. The surface layer is a light yellowish brown to brown gravelly loamy sand to sandy loam layer about 12 inches thick on average. The layer is weakly coherent with single grain structure, very friable, non-sticky and non-plastic, and moderately alkaline. This layer is suitable for reclamation even though soil texture can be coarse.

The underlying material ("C" horizon substratum) to a depth of 50 inches or more is very pale brown very gravelly coarse sand, with over 60 percent gravel. The soil is excessively drained, and permeability is very rapid. Surface runoff is slow except during thunderstorms when runoff from higher-lying soils exceeds the infiltration rate. The underlying material is not suitable for reclamation due to very coarse texture and high volume of coarse fragments.

The hard, metamorphic rock that is found from the open pit to the eastern portion of the mine site contains Rock Outcrop and the Gachado soil family (mapping unit MR). Rock outcrop comprises approximately 80 percent of the unit and typically occupies ridges. The Gachado soil family, about 20 percent of the unit, occupies hill and mountain slopes. Rock outcrop is mostly barren but does include some plants that have become established in fissures or pockets of soil material.

The Gachado family consists of very shallow and shallow, well-drained soils that were formed largely from weathered granite rock. Slopes are moderately steep to steep. The surface layer is a brown very cobbly fine sandy loam about 2 inches thick. The underlying material to hard bedrock, which is encountered at an average depth of about 10 inches, is a reddish brown gravelly sandy clay loam. The soil is unsuitable for reclamation due to the dominant bedrock presence, steep slope, and coarse fragments.

Previously disturbed soils occur in areas that have been subjected to historic mining activities and other development activities. Soils present in these areas have been compacted, mixed with other soils and coarse fragments (i.e., gravel or rock). Therefore, these soils have been physically degraded from their natural state as a result of historic development activities and are considered lower valued soils than soils that occur in adjacent undisturbed areas.

Prior to expansion of facilities onto undisturbed areas, surface material, if available, will be scraped, used for concurrent reclamation (preferable), and/or stored in separate soil stockpiles. An estimate of the amount of suitable surface material is provided in Table 7 based on the areas to be disturbed by phase and by the average soil depth. The total volume of suitable surface material is estimated at about 428,000 CY for Phase 1 and 86,000 CY for Phase 2. A uniform cover of surface material over most disturbed areas would be at a depth of up to 4 inches.

The three main long-term surface material stockpiles cover approximately 30 acres and are shown on the Mining Plan (refer to Figure 5). They are located adjacent to the larger planned facilities including the West Overburden Stockpile, the Northwest Evaporation Ponds, and the East Tailings Storage Area. Additional temporary soil stockpiles may be temporarily located adjacent to their source. Surface material salvage operations will be conducted only as needed immediately prior to development or expansion of a mine component. When possible, the surface material will be immediately utilized for ongoing revegetation efforts. Surface material that cannot be used immediately for revegetation will be stockpiled separately and clearly identified. Stockpiles will be planted with an erosion control cover or covered with larger sized material to inhibit wind and water erosion.

Areas to be reclaimed will be covered with this surface material to provide a natural seed source and enhance broadcast seeding and transplanting. No soil supplements are recommended, as all plant species utilized will be native to the existing soil and climate.

TABLE 7
ESTIMATED SALVAGABLE SURFACE MATERIAL

Mine Component	Sunrise-Like Soil [1]		Arizo-Like Soil [2]		Rock Outcrop [3]		Totals	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
	AC [4]/VOL [5]	AC/VOL	AC/VOL	AC/VOL	AC/VOL	AC/VOL	AC/VOL	AC/VOL
West Overburden Stockpile	70 / 68	- / -	20 / 32	- / -	- / -	- / -	90 / 100	- / -
Northwest Evaporation Ponds	119 / 112	- / -	17 / 27	- / -	- / -	- / -	136 / 139	- / -
North Overburden Stockpile	61 / 60	66 / 64	- / -	- / -	- / -	- / -	61 / 60	66 / 64
East Tailings Storage Area	- / -	- / -	15 / 22	5 / 8	150 / 40	52 / 14	165 / 62	57 / 22
Totals	250 / 240	66 / 64	62 /81	5 / 8	150 / 40	52 / 14	452 / 361	123 / 86

Sources: ENSR Soil Assessment, 1996; TRC, Lilburn Corporation, 2002
(1) Average depth of 7 inches.
(2) Average depth of 12 inches.
(3) Assume 2 inches of gravelly growth media.
(4) AC – acres
(5) VOL – Volume in thousands of cubic yards.

2.12 DRAINAGES AND EROSION CONTROL

Surface drainage on or near the site rarely occurs except during heavy showers. Drainage and sheet flow as previously discussed in Section 1.5.2, will not substantially change during or after reclamation. Recontouring of overburden stockpile slopes and overall revegetation will reduce potential erosion. Minor changes to local runoff patterns may occur around and adjacent to removed facilities such as buildings. These areas will be graded or drainage controlled or bermed to divert local runoff to natural drainages.

2.13 PUBLIC SAFETY

Upon termination and the determination that no future mining and/or mineral recovery operations will take place, all un-necessary buildings, equipment, tanks, and refuse will be removed. Fencing on the north, west, and south sides of the site will restrict vehicle access onto Molycorp property with three-strand barbwire marked by private property/trespass and danger signs. The south side is and will be fenced on the north side of I-15. The north side of the site is inaccessible with rugged terrain. A 6-foot high safety berm with safety signs will be constructed around the pit rim with pit access roads blocked by boulders. Fencing, gates, or other reasonable means will secure other hazardous areas. A guarded gate will secure the main access and entrance until such time that onsite remediation has been completed.

2.14 MONITORING AND MAINTENANCE

Reclamation efforts will be monitored pursuant to SMARA requirements and according to the County of San Bernardino approved Reclamation Plan. Molycorp will be required under SMARA (Public Resources Code Section 2207) to submit an annual status report. SMARA (Section 2774(b)) requires the lead agency to conduct an inspection of the mining operation within six months of receipt of the required Annual Report. In addition, Molycorp will be required to submit an annual Mitigation Monitoring and Compliance Report to the County to review implementation and the status of the conditions and mitigation measures.

2.15 RECLAMATION ASSURANCE

Molycorp assures reclamation of the site in compliance with Section 2773.1 of SMARA in the form of an irrevocable letter of credit payable to the County of San Bernardino and the California Department of Conservation, Division of Mines and Geology. The financial assurance will be approved for the implementation of this Reclamation Plan and will be reviewed and adjusted annually to account for new lands disturbed, inflation, and reclamation of lands accomplished in accordance with the approved Reclamation Plan (SMARA, Section 2773.1 (a)(3).

The current financial assurance for reclamation of nearly $2.3 million payable to the County of San Bernardino and the California Department of Conservation, Division of Mines and Geology is on file with the County and will be updated during the review of this Reclamation Plan. Financial assurance for the site is augmented by a corporate guarantee on file with the California Department of Toxic Substances Control for closure costs at the facility, post-closure maintenance and monitoring, and corrective action/remediation. In addition, Molycorp has a

separate financial assurance in the form of a Letter of Credit issued in favor of the RWQCB for the closure and post-closure maintenance of the various onsite ponds per Title 27, Chapter 7, Section 22510(f).

These three financial assurances are on file for onsite reclamation with the County and the Department of Conservation, for facilities' closure with the DTSC, and for pond closures and groundwater remediation with the RWQCB. Amounts for these financial assurances vary and are adjusted periodically depending on onsite activities.

3.0 GEOLOGY

The geology of the Mountain Pass region is described in detail in the EIR. The Mountain Pass district overlies a faulted block of Precambrian metamorphic rocks, which are bounded on the east and south by alluvium, which extends down into Ivanpah Valley (see Figure 21). On the west, this block is bounded by the Clark Mountain fault which delineates a line along which occur to the west, volcanics and sedimentary units of Paleozoic and Mesozoic age. The east-west trending North Fault marks the northern boundary of the district. The Precambrian metamorphic complex is comprised of a large number of varied lithologic types such as: garnetiferous mica gneisses and schists; biotite-garnet-sillimanite gneiss; hornblende gneiss and schist; amphibolite, biotite gneiss and schist; granite gneisses and migmatites; granitic pegmatites; and minor amounts of foliated mafic rocks.

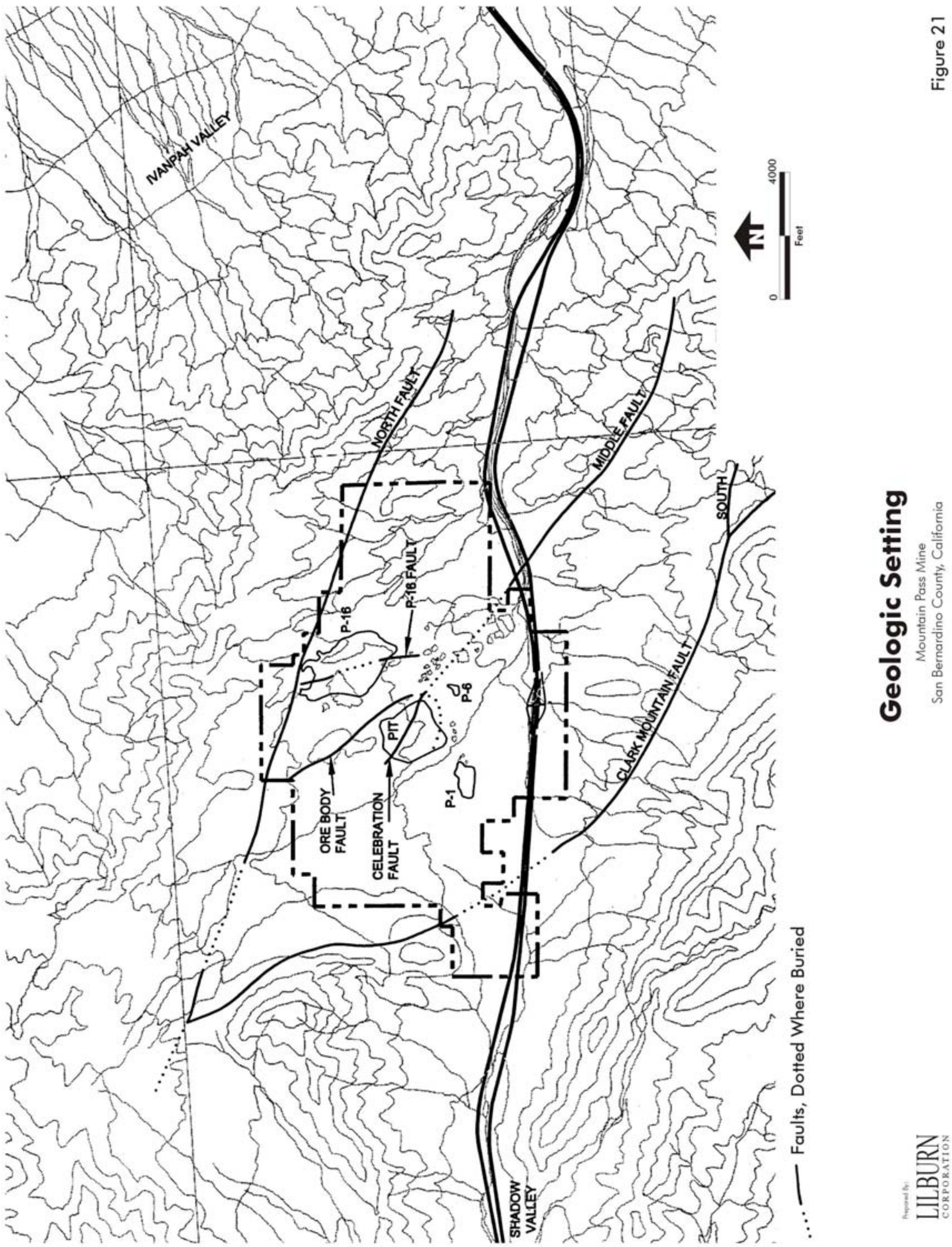
The rare-earth-bearing carbonatite rocks are spatially related to potash-rich igneous rocks of Precambrian age that cut the metamorphic complex. The larger potash-rich intrusive masses, 300 or more feet wide, constitute one granite, two syenite and four composite shonkinite-syenite bodies. One of the shonkinite-syenite blocks is 6,300 feet in length. Several hundred relatively thin dikes of potash-rich rock range in composition from biotite shonkinite through syenite to granite. Although a few thin and fine-grained shonkinite dikes cut the granite, the mafic intrusive bodies are generally the oldest, and granitic rocks the youngest. The Precambrian rocks are intruded by east-trending Tertiary andesitic dikes, which have been displaced by younger faults.

Veins of carbonatite rocks are most abundant in and near the southwest side of the largest shonkinite-syenite body. Most veins are less than six feet thick. One mass of carbonatite near the Sulphide Queen Gold Mine is 700 feet in maximum width and 2,400 feet in length. Although around 200 veins have been mapped in the district, their aggregate surface area is probably less than one-tenth of the large carbonatite mass. The numerous veins of carbonite rocks are primarily composed on calcite and other carbonates. Bastnasite, the fluorocarbonate containing lanthaninde elements of the cerium group, is the mineral of primary interest. Bastnasite was found at Mountain Pass in 1949 and subsequent geological mapping has shown that these deposits occur in a belt approximately six miles long and 1.5 miles wide (Olsen et al 1954). They are found generally in the area between the Middle and North faults, trending north to northeast.

Faults

The dominant fault in the vicinity is the Clark Mountain Thrust fault, which forms the western boundary of the metamorphic block the mine is located on. Mapped as an extension of the Mescal Thrust by Evans, 1971, it is a north-northwest-trending thrust located along the west side of the Clark Mountain Range and has thrust Paleozoic limestone onto Precambrian rocks. Olson et al, 1954 indicates that post-early Tertiary movement exists on the Clark Mountain Thrust, indicated by offsetting of Tertiary andesite dikes. Lack of evidence for Holocene movement indicates this fault is apparently inactive.

Complex faulting exists within and surrounding the mining operations. This faulted area is bounded on the north by the left lateral North Fault, and on the southwest by the South Fault, also left lateral. These faults are reported to dip 65-80 to the south-southwest and could have up


IVANPAH VALLEY
NORTH FAULT
MIDDLE FAULT
SOUTH
CLARK MOUNTAIN FAULT
P-16
P-16 FAULT
PIT
P-6
P-1
ORE BODY FAULT
CELEBRATION FAULT
SHADOW VALLEY
N
0
4000
Feet
Faults, Dotted Where Buried
Geologic Setting
Mountain Pass Mine
San Bernardino County, California
Figure 21
Prepared By:
LILBURN CORPORATION

3-2

to one mile of displacement. Between these two faults, Olson et al, have mapped an additional left lateral fault (Middle Fault) trending northwest and dipping 80 southwest to vertical. The southwest block probably has upward movement relative to the northeast side.

Little is known about the faulting under the alluvial cover south of the mine pit. Ellis, 1979, interpreted several east-west-trending faults from a magnetic survey performed in the area. These faults are interpreted to have both vertical and horizontal movement, and are possibly related to the Clark Mountain Thrust.

The site is not within an identified Alquist-Priolo Fault Zone, which is an area of potentially active and recently active faults.

This area of the East Mojave has had low seismic activity in recent history. A search was conducted in 2000 for recorded earthquakes within 100 km (63 miles) of the site. Of these, twelve were magnitude four or higher. The strongest occurred in 1916, 27 miles west of the site and had an estimated magnitude of 6.1. The most significant recent earthquakes in the Mojave Desert region were the 1992 Landers Quake (7.1 magnitude) and the 1999 Hector Mine Quake (7.3 magnitude), approximately 70 miles from Mountain Pass.

The maximum credible earthquake (MCE) for the Mountain Pass area is estimated to be magnitude 6.1 (Algermissen, et al., 1982). According to the probabalistic earthquake map of the United States this would result in ground motion of less than 7.5 of normal gravity acceleration (0.075g). A peak acceleration of 0.32 gravity was calculated for the mine site based on this earthquake and has been used to evaluate the stability of major structures at the site. There is a 90 percent probability this will not be exceeded in any given fifty-year period (Algermissen, et al., 1990). The controlling fault for an MCE would be the Pahrump-Stateline Fault located approximately 11 miles east of the site (Mualchin and Jones 1992). This fault is considered to be potentially active at present (Jennings 1992).

A number of Geological Reports have been completed for areas within and surrounding the project site and some are listed below.

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4.0 HYDROLOGY

Climatic Data

The project site lies within the Mojave Desert and exhibits a dry-hot Desert Climate. The climate is moderated by its elevation, which ranges from 4,500 to 5,100 feet above mean sea. Annual temperatures range from 10º F on winter mornings to 110º F during the summer. Precipitation is produced during the winter by Pacific frontal systems and during the summer by southerly surges of subtropical moisture. Annual precipitation recorded for the past 50 years at Mountain Pass averages 8.40 inches.

Surface Drainage

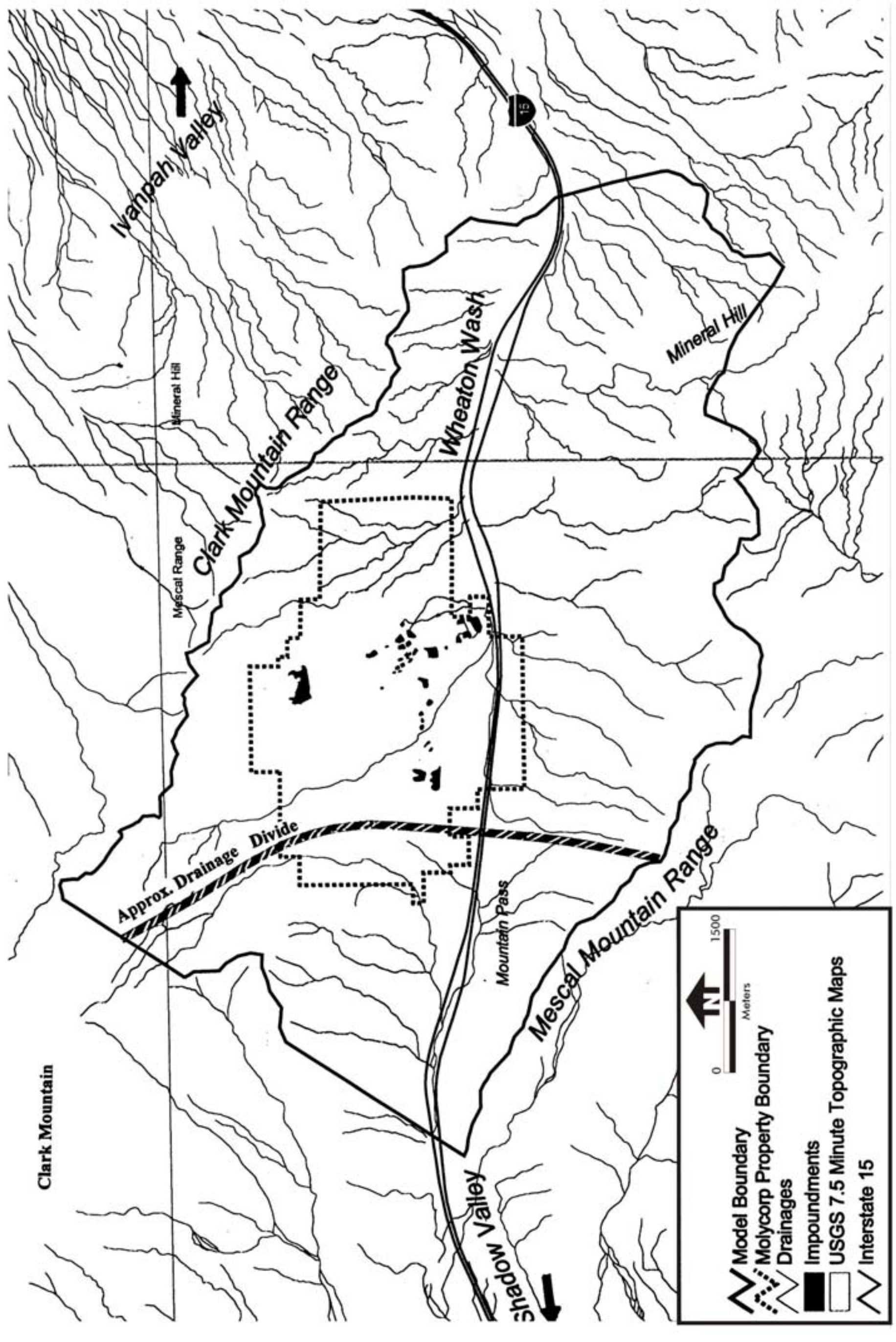
The project site is surrounded by the Clark Mountain Range to the north and northeast, the Mineral Hills to the southeast, the Mescal Range to the southwest, and the Mohawk Hills to the northwest. Ground water and surface water originates at these higher elevations and either infiltrates directly at the ground surface or runs off into more conductive strata, such as alluvial fans and ephemeral streams. These mountain ranges drain into an alluvial basin at Mountain Pass and two distinct watersheds discharge surface and ground water to the east and west of the mine site (see Figure 22). The drainage to the west discharges into Shadow Valley and drainage east of the mine site moves within Farmers Wash and Wheaton Wash into Ivanpah Valley. The total area of the drainage basin is approximately 14,000 acres.

No substantial changes to major surface drainages will occur onsite as surface runoff in this arid climate occurs only briefly following heavy precipitation. Onsite runoff is controlled or diverted and contained by standard berms, culverts, and channels as necessary in disturbed areas. The runoff is directed into the Jack Myers Pond (P-20A) and into the mill stormwater containment pond (P-29) for stormwater retention and de-sedimentation. Molycorp implements a Stormwater Pollution Prevention Program at the facility. These waters are then redirected into natural channels to the west and east of the site. Please refer to Sections 1.5.2 and 2.12 for additional information.

Ground Water

Numerous reports and studies have been prepared assessing the existing ground water conditions and impacts to ground water. Molycorp is conducting ongoing ground water monitoring of the mine site under LRWQCB Order Nos. 6-91-836, 6-90-56, and 6-90-41, and is implementing a revised Ground Water Corrective Action Program as specified in LRWQCB Cleanup and Abatement Order No. 6-98-19.

Ground water in the vicinity of the site occurs within the coarse, unconsolidated alluvial sediments and within fractured bedrock. The majority of the ground water flows eastward down the Wheaton Wash drainage toward Ivanpah Valley. A portion of the ground water also flows westward toward Shadow Valley.



Hydrologic Setting

Mountain Pass Mine
San Bernardino County, California

Figure 22

Prepared By: LILBURN CORPORATION

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Additional information on ground water can be found in Sections 1.4 and 2.10 of this Plan, in the project EIR, and from the following reports listed in Section 6, in particular the recently completed "Analysis of Ground Water Hydrology at Mountain Pass" by Geomega.

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5.0 ACRONYMS AND GLOSSARY

5.1 ACRONYMS

AHM	Acutely hazardous material
BLM	Bureau of Land Management
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CAO	Clean-up and Abatement Order
CAP	Corrective Action Program
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CIWMB	California Integrated Waste Management Board
CUP	Conditional Use Permit (County land use permit)
CY	cubic yards
DEHS	Department of Environmental Health Services
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
F	Fahrenheit
gpd	gallons per day
gpm	gallons per minute
HDPE	High Density Polyethylene (pipeline material)
HMBP	Hazardous Materials Business Plan
I-15	Interstate 15
LCRS	Leachate Collection and Removal System
LnO	lanthanide oxide
MCE	Maximum credible earthquake
MDAQMD	Mojave Desert Air Quality Management District
MSHA	Mine Safety and Health Agency
msl	mean sea level
NEIC	National Earthquake Information Center
NORM	Naturally Occurring Radioactive Materials
NPS	National Park Service
OSHA	Occupational Safety and Health Act
RCRA	Resource Conservation and Recovery Act
RMPP	Risk Management Prevention Plan
ROWD	Report of Waste Discharge (RWQCB)
RWQCB	Regional Water Quality Control Board
SMARA	Surface Mining and Reclamation Act (State of California)
SWPPP	Storm Water Pollution Prevention Plan
TSDF	Treatment, storage, or disposal facility
USGS	United States Geological Survey
WDR	Waste Discharge Requirements

5.2 GLOSSARY OF TERMS

Active fault: Geologic fault with recent seismic activity that has displaced materials not more than 12,000 years old.

Alluvium: A general term for geologic materials deposited by running water (e.g., streams, rivers). The term applies to deposits of recent time that have not been consolidated and cemented into rock.

Alquist-Priolo Fault Zone: State-identified areas of potentially active and recently active faults.

Baghouse: Air pollution control equipment consisting of fabric filter systems that remove dust from a gas stream by passing the stream through a porous fabric.

Bastnasite: A fluoro-carbonate of the cerium group of rare earth (lanthanide) metals occurring in alkaline rocks.

Bedrock: The solid rock that underlies other superficial material.

Bench: Terrace or leveled area breaking the continuity of a slope.

Beneficiation: Methods of mineral recovery from ores to regulate its size, remove unwanted constituents, and improve the quality, and purity of the product.

Berm: An elongate earthen structure which acts as a barrier; e.g., to make it difficult for a vehicle to cross, or to redirect the flow of water.

Calcination: Heating ore in an oxidizing atmosphere to expel volatile matter and water, causing disintegration or to make the mineral more friable (easy to crumble or break).

Carbonates: Compound containing the acid radical of carbonic acid. Examples of carbonates include calcium carbonate (calcite) and calcium-magnesium carbonate (dolomite).

Celestite: The mineral source of strontium and its compounds. Used to impart iridescence to glasses and glazes and as fining agents in crystal glass.

Cerium: The most abundant element of the rare earth group used in ultra-violet absorption glass and lighter flints. It is an ingredient in many types of glass and is used in the manufacture of glass grinding and precision polishing compounds for lenses and monitors and television faceplates. Cerium also acts as a de-colorizer of glass to produce clear glass; virtually all glass has cerium. It is used as an alloying agent for grain growth control, ferrous and non-ferrous, and as a catalyst in automotive exhaust systems. Cerium is a component of paint and printing ink driers. It is an ingredient in ultraviolet absorbers in plastics, inorganic pigments and coatings.

Cover: Low-permeability compacted soil or impermeable geosynthetic liner and cap placed over closed waste management units to restrict percolation of surface waters through the waste material to minimize ground water contamination.

Class III landfill: Facility that allows only the disposal of "nonhazardous municipal solid waste and construction debris waste."

Closure: Process during which a waste management unit that is no longer receiving waste is undergoing operations necessary to prepare the unit for post-closure maintenance in accordance with an approved plan for closure.

Conditional Use Permit: A land use permit issued by a local agency such as a County, to allow operations with conditions generally related to hours of operations, project phasing, etc.

Crusher: A machine for crushing ore and rock to a desired size. There are various types of crushers including jaw, impact, roll, cone, and milling.

Culvert: A covered pipe or channel used to drain water.

Environmental Impact Report (EIR): Document in which the impacts of any state or local, public or private project action which may have a significant environmental effect are evaluated prior to its construction or implementation, as required by the California Environmental Quality Act (CEQA).

Europium: A metallic element of the rare earth group used extensively as an activator for the red phosphor used in color monitor and TV screens. It is also being used in high and low pressure mercury vapor lamps. Additional applications are found in lasers, as an ingredient in phototropic glass and in energy efficient lamps.

Evaporation Pond: A lined surface impoundment where wastewater is placed in order to remove moisture.

Factor of safety: Ratio of forces resisting slope or foundation failure over forces driving slope or foundation failure.

Fault: A geologic fracture or fracture zone along which there has been displacement of the sides relative to one another.

Flotation: The method of mineral separation in which a froth is created in water by a variety of reagents. The froth floats finely crushed minerals while other minerals sink.

Freeboard: The vertical distance between the static water level and the crest of a dam or impoundment which typically allows for the collection of run-on and precipitation.

Gadolinium: A rare silvery-white metallic element, a member of the rare earth group. Applications in microwave control devices for space communications. It is used in nuclear

reactor shielding and control because it has the highest thermal neutron absorption cross-section of any element. When added to titanium, gadolinium gives higher ultimate and tensile strengths.

Gangue: Rock or mineral aggregates in an ore that are economically undesirable when separated from the economic minerals.

Geosynthetic: Flexible impermeable materials or membrane used as a barrier to infiltration of waste fluids to the underlying soils and/or ground water or used as part of the closure cover to eliminate water infiltration into a close waste management unit. Includes geomembrane, synthetic liner, and geocomposite liner.

Geotextile filter: A synthetic permeable cushion layer placed over the geomembrane component of a composite liner to protect the geomembrane from overlying coarse, granular materials used to construct a leachate collection and removal system.

Groundwater basin: Underground geologic formation with sides and bottom of relatively imperious material in which groundwater is held or retained. Aquifer or system of aquifers with well-defined boundaries.

Groundwater gradient: The slope of the profile of the water table under unconfined groundwater conditions, or the slope of the imaginary surface to which groundwater rises due to hydrostatic pressure under confined conditions (wells and springs).

Group A, B, or C Waste Group Classification (CCR Title 27, Section 22480, (b)):

> Group A – mining wastes that must be managed as hazardous waste provided the RWQCB finds that such mining wastes pose a significant threat to water quality.
>
> Group B – mining wastes that consist of or contain hazardous wastes that qualify for a variance under Chapter 11 of Division 4.5 of Title 22, provided that the RWQCB finds that such mining wastes pose a low risk to water quality; or mining wastes that consist of or contain nonhazardous soluable pollutants of concentrations which exceed water quality objectives for, or could cause, degradation of waters of the state.
>
> Group C – mining wastes from which any discharge would be in compliance with the applicable water quality control plan.

Haul road: A road used by haul trucks to haul ore and overburden from the open pit to other locations usually to the crusher feed or to the overburden stockpiles.

Hazardous material: Substance which, because of its potential for either corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness, may cause injury to persons or damage to property.

Hazardous waste: Defined in Section 1004(5) of the federal Resource Conservation and Recovery Act (RCRA) as, "…a solid waste, or combination of solid wastes, which because of its

quantity, concentration, or physical, chemical, or infectious characteristics may: (a) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environmental when improperly treated, stored, transported, or disposed of, or otherwise managed."

Hydraulic conductivity: A coefficient of proportionality describing the rate at which water can move through a permeable medium (permeability coefficient).

Igneous rock: Rock that resulted from the solidification of molten or partly molten material.

Inert waste: Solid waste that does not contain hazardous waste or soluable pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste. (CCR, Title 27, Section 20230)

Infiltration: The flow of a fluid into a substance through pores or small openings.

Interim management plan: Per SMARA, a plan to provide measures to maintain an idle site in compliance with its approved Reclamation Plan and conditions. An mine is considered idle if 90 percent of its operations are idle for over a one year period.

Lanthanum, lanthanide: The most common and most basic element of the rare-earth group. This group includes 15 elements (Atomic numbers 57 – 71) within a family or series of elements which are similar in their ability to form specific unique chemical and physical components Lanthanum oxide is used in precision optical lenses, fiber optics, and ceramic capacitors and also is used as a catalyst in cracking petroleum crudes and increasing the yield of gasoline.

Leachate: Any liquid formed by the drainage of liquids from waste or by percolation or flow of liquid through waste. Leachate is typically water that has infiltrated through, and come in contact with, landfill waste and as a result may contain both suspended and dissolved substances from the waste material.

Leachate Collection and Removal System (LCRS): A waste management unit's containment system that is designed and constructed to collect all leachate and to convey it to a designated collection area for treatment or disposal.

Metamorphic rock: Any rock derived from pre-existing rocks in response to marked changes in temperature, pressure, stress, etc.

Mill/Flotation plant: At the Molycorp facility, the plant located south of the pit where ore is crushed, ground, conditioned, concentrated, dried and packaged.

Mine pit: Area from which ore and overburden are removed.

Mining waste: Waste from the mining and recovery of ores and mineral commodities. Mining waste includes overburden; natural geologic material which has been removed or relocated but

has not been processed (waste rock); and the solid residuals, tailings, and liquids from the recovery of ores and mineral commodities. (CCR Title 27, Section 22480 (a))

Neodymium: A metallic element and a member of the rare earth group. It is used with cerium to decolorize glass, to improve brightness and contrast in monitor screens, and to make it opaque to ultraviolet light. Neodymium magnets are used in braking and air bag systems, computers, and cellular phones. It is used in welder's lenses, lasers, better-grade sunglasses and special optical filters. In combination with other additives it produces a range of colors from pure violet through wine red to gray.

Ore body: A generally continuous mass of ore distinct from the surrounding rock.

Overburden: A layer of material which overlays the useful mineral or ore deposit.

Overburden stockpile: Areas onsite used to place the overburden removed from the pit.

Permeability: The capacity of porous rock, sediment, or soil for transmitting a fluid.

Permit to Operate: Written air quality permit which must be obtained from the Mojave Desert Air Quality Management District before the facility or equipment subject to an Authority to Construct is put into operation.

pH: Measure of acidity; the logarithm to the base 10 of the reciprocal of the H+ concentration ([H+], i.e., the negative logarithm of the [H+]).

Post-Closure Maintenance: All activities undertaken at a closed waste management unit to maintain the integrity of containment features and to monitor compliance with applicable performance standards. Maintenance and monitoring are required for a 30-year period or until the RWQCB determines that water quality aspects of reclamation are complete and waste no longer poses a threat to water quality.

Praseodymium: A pale yellowish metallic element of the rare earth group. It increases infrared absorption of glass. Used with neodymium it will color glass without changing the index of refraction. With zirconia/silica, it produces a clear-yellow ceramic tile glaze. In combination with other elements, other glaze colors are possible such as pure salmon, green and turquoise.

Rare earths: A series of relatively scarce minerals containing oxides of the rare earth metals, lanthanum – lutetium on the periodic table.

Reclamation: The combined processes of land treatment intended to minimize adverse environmental impact from surface mining operations. See SMARA, Article 2 section 2733.

Reclamation Plan: A restoration plan for the stabilization and recovery of a mine site after cessation of mining operations for another use; generally open space or other low intensity use.

Regional Water Quality Control Board (RWQCB): State of California Agency, which administers the requirements of the California Administrative Code, Title 27 to ensure the highest possible water quality consistent with all demands.

Remediation: Correction of an accidental release or restoration to a natural state.

Responsible agency: The organization that has the lead duty to ensure that developers comply with the appropriate rules and regulations.

Revegetation: Establishment of native vegetation on lands that have been disturbed.

Samarium: A pale grey metallic element of the rare earth group. Samarium oxide increases infrared absorption in glass and is used as a high-temperature protective coating. Combined with cobalt iron permanent magnets to produce energy efficient electric motors and is used in computer disk drives.

Scrubbers: Air pollution control equipment used to separate soluable gases or to remove dust from the air stream.

Separations Plant: Facility where the bastnasite concentrate undergoes a series of beneficiation steps to separate, concentrate, and extract the economic minerals (concentrations) from the uneconomical minerals.

Slurry: A mixture of water and suspended solids.

Specialty Plant: Facility onsite that further produces high purity and/or specialty products utilizing a variety of beneficiation methods such as solvent extraction.

Tailings: Materials separated during beneficiation of ore at the mill/flotation plant that are considered residual materials distinguished from the economic minerals. Stored in tailings impoundments P-16 and planned East Tailings Storage Area. Approximately 10 percent of mill feed is made up of recycled tailings.

Tailings impoundment or pond: An enclosed area, with a constraining wall embankment or dam at the lower end, into which mill tailings are released in a slurry.

Title 27: Part of the California Code of Regulations that governs the operation and construction of mining waste facilities and the closure and post-closure maintenance of such units.

Total dissolved solids (TDS): The dry residue from the dissolved matter in a water sample that remains after the sample ahs evaporated. The TDS serve as an indicator of the chemical quality of waters.

Waste Discharge Requirements: Regulation described in CCR, Title 27 which governs discharge of wastes in order to preserve the quality of the state's surface and ground waters.

Waste rock: Material excavated during mining activities with little or no economic value.

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